Pinel à la Salpêtrière Ordering the Chains Stricken from the Limbs of the Insane.

From a painting by Robert Fleury, engraved and published by Goupil & Co.. Paris and New York. Kindness of Mlle. Laflin, Paris.

The History of Medicine

Philosophical and Critical, from Its Origin to the Twentieth Century

By

David Allyn Gorton, M.D.

L'homme, né dans une ignorance complète des vérités scientifiques, doit les conquérir par l'étude attentive de la nature.

Despine

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The History of Medicine

SIXTH: PERIOD OF THE NINETEENTH CENTURY

(*FIRST DECADE*)

CHAPTER XI

PROGRESS OF MENTAL PHYSIOLOGY AND PATHOLOGY

THE state of impassivity which characterized the practice of medicine at the close of eighteen hundred extended to the sciences associated with brain and mind. It is true that some gleams of light had been reflected on the subject by Pinel, Gall, and others; but on the whole the subject was in a state bordering on apathy. The profession in general showed little interest in it, and were apparently insensible to its importance, for reasons sentimental and a disinclination to enter a sphere of inquiry which was occupied by the Ecclesiastics. Rome had arrogantly assumed the prerogative of taking care of the maladies of the mind, holding fast to the proposition that brain and mind formed no part of the physical personality. For this reason the study of the brain as a physical organ of mentality, and a part of the general physiology, had been neglected, and turned over to the care of the spiritual authorities.

The brain had been regarded since the days of Hippocrates as a gland, the function of which was to secrete humors or fluids, for the uses of the body. This idea was entertained by men of science until near the close of the eighteenth century, and later by many prominent writers on medical subjects. The Ecclesiastics gladly embraced that hypothesis, since it gave them a semblance of authority by which to justify their views. Whitt, Barry, Fleming, and others of the Edinburgh school held that view of the brain. The medium of communication between that organ and the body was known to be by nerves, current and recurrent, efferent and afferent, of course; but by means of the nervous fluid, or "animal spirits," flowing back and forth from and to the brain in the same manner that many by no means unlearned people suppose that messages are sent through telephone and telegraph wires by an electric "fluid." Men of that period talked learnedly of the imponderable, of things without form or weight to us, simply because we had no senses acute enough, or scales adjusted nicely enough, to detect them. They were only *practically* imponderable. The term dynamis (δύναμις), of forces dynamic to them, had no signification. The nervous fluid, in flowing back and forth so much between brain and muscle, was supposed to wear a crease in the nerves by which automatism was produced, as one sees in the rapidity with which the keys

of musical instruments are played upon. It is thus that *habits* of motion were conceived to be fixed, and no longer to require mental direction. This view is held in certain quarters by psychologists to-day, and falsely used to explain habit.

But what was this "animal spirits"? And of what did it consist? Fleming said "it was the quintessence of the blood and other juices, the vehicle of which is lymph and water extremely desiccated and movable, and extremely attenuated by flowing through vessels which from large become gradually smaller, being rarefied by heat and a subtile vapor." Again: "The nervous fluid, or 'animal spirits' consists of phlegm or water, oil, animal salt, and earth, all highly attenuated and subtilized, and intimately mixed and incorporated together." "This nervous fluid," says Dr. Barry, "seems to be formed for more extensive uses than sensation and motion." "This fluid, so far as we can discover by its effects," says another celebrity of that century (Dr. Mead), "is thin, volatile liquor, of great force and elasticity, being indeed, most probably, a quantity of the mineral elastic matter, incorporated with fine parts of the blood, separated in the brain and lodged in the fibres of the nerves," etc.[1] Such were the conceptions of the functions of brain and nerves, of thought and feeling, the latter part of the eighteenth century, at the greatest university in Europe.

[1] Russell's *History and Heroes of Medicine*, pp. 284–285.

Had these learned gentlemen studied the anatomy and physiology of the brain inductively, in accordance with the rules promulgated by Lord Bacon, they would have escaped the gross absurdities into which they fell. They committed the error of many others of that age, namely, of attempting to explain phenomena of which they knew nothing, and of which they possessed no means of knowing anything. Of a psychic animating force or principle in living matter they could not conceive. Yet the evidence of it was all about them. They had only to cease to interrogate consciousness and apply themselves to the study of nature to find clues, clear, certain, and unmistakable, to what they sought. They had only to turn away from theorizing and act on Bacon's method of studying nature to arrive at the verities. The ovum of an ape and a man are identical; and yet how diverse their potentiality. The nucleated cell which becomes a man or a woman cannot be differentiated from each other, nor from that of a dog or a fish, by any microscope which man has been able to devise. Yet the Inerrant Intelligence (φύσις), which dominates the destiny of each, knows which is which, and even the sex of each! It is well to confess that there are a few things inscrutable to finite intelligence as yet; we should be willing to wait for more light.[1]

[1] The queen mother of the bee is said to know the sex of every fecundated ovum that she lays, to the number of about three millions during a season. See Maeterlinck, *On the Bee.*

Richard Mead.

From a print by Fisher & Son, London and Paris.

Descartes, the metaphysical phenomenon of the eighteenth century, with his atoms and pores, matter and motion, currents and vortices, explaining everything and nothing, seized upon the pineal gland, a lonely isolated body within the cranium, as the site of the mind or soul. Not having been accorded a function by the physiologist, he gave it one. There, perched in its exclusive habitation, it surveyed the operations of the body, sole monarch of all it surveyed!

The aura or hilatus that generally precedes an epileptic seizure, and the reflexes that attend the onset of certain other maladies were regarded as vapors that were surging back to the brain whence they came, and in epilepsy, having reached that organ, brought on the convulsive fit. So, likewise, the aura that supersensitive eyes see, or pretend to see, surrounding the heads of saints, clairvoyants, and divine subjects, is nothing but vapor streaming from the brain, which sometimes produces it in excess. Haeckel calls this aura psychoma (ψῦχόμα).[1] The divine men and women of antiquity, the gods and goddesses, manifested this peculiarity, according to the conceptions of painters, who represent them with radiant heads. After all, there is a basis of fitness, if not reason, in these things, for man in his perfection is a supreme being, and if he be a Sun of the planet, as a great poet of that day declared (Novalis),

[1] *Vide* Haeckel's *Wonders of Life.*

why should not his brain give off electrical scintillations?

Had Descartes devoted his great genius to the study of biology, his conceptions of the Kosmos and the Power that rules it would have been altogether different; as also would have been his conceptions of brain and mind. Or had he been familiar with the writings of his illustrious contemporary, Milton, and profited by them, he would have been as likely to place the residence of a person's soul in his big toe as in the pineal gland! Milton's conception of the soul was grand, as grand as that of the illustrious Aristotle. Here it is:

> That man is a living being, intrinsically and properly one and individual, not compound and separable; not according to the common opinion, made up and framed of two distinct and different natures, as of soul and body—but the whole man is soul and the soul man; that is to say, a body, or substance, individual, animated, sensitive and rational.[1]

Milton's psychical conception of man is, it seems to us, grand, wholesome, and salutary. Every animated atom of his body partakes of the soul, or psychical nature.

The celebrated Le Clerc, a learned historian and physician, writing at the same period as Descartes, saw no reason to look upon the brain

[1] *Discourse on Christian Doctrine. Prose Works*, vol. IV., p. 188. Bohn's Edition.

in any other light than that of the ancient physicians, namely, that it was a gland whose function was to secrete vapors and regulate their circulation in the body, very much as the heart regulates the circulation of the blood. Whenever the brain becomes overcharged with this humidity, it sends the surplus to the dependent parts, especially to the glands, the overcharge of which causes fluxions and catarrhs, such as colds and coryzas. Lest we do the distinguished author injustice we cite his words:

Mais il y a ceci de plus, à l'égard du cerveau. C'est que la tête étant creuse, et d'une figure ronde, elle attire continuellement, comme une espace de ventouse, l'humidité de toutes les parties du corps, qui s'éléve en forme de vapeurs, après quoi la tête s'en trouvant trop chargée, elle renvoyé aux parties d'embas, et particulièrèment aux glandes, ce qu' elle en a de trop; d'ou viennent les fluxions et les catarrhes.[1]

The celebrated Rush, writing half a century later, while conceding that the brain was the *instrument* of the mind, could find no evidence of brain disorder in cases of insanity. He was forced to conclude, therefore, that insanity was some affection of the blood and the blood vessels of the brain.[2] It is worthy of note that long after it was admitted by men of intelligence that

[1] Le Clerc, *Histoire de la Médecine, première partie*, liv. iii., chap. iii., p. 129.

[2] *Vide ut supra*.

the relation of brain and mind was intimate, they insisted that brain was the instrument and not the organ of the mind; that the mind was an immaterial something that used the organs of the brain very much as the pianist's fingers the keys of a piano in playing a sonata or a symphony. In other words, they inverted the relation of cause and effect, as Prof. Wm. H. Thompson does in his excellent and interesting volume on "Brain and Personality" of recent date.[1] In fact, it is

[1] The learned author cites the influence of habit as an example of generating *de novo* mental powers or faculties, and draws the deduction therefrom that new centres of mental functions may be generated thereby; and in this fact, says the author, "we arrive at one of the most important conclusions, namely, that the grey layer of our brains is actually plastic and capable of being fashioned. It need not be left with the slender equipment of function which nature gave it at birth" (*Brain and Personality*, page 121). It is clear, from the above, that the author would have us believe that the specific elements of mentality are mutually convertible, and that a new mental element may be created by cultivation. Such a doctrine is revolutionary in mental philosophy. We do not see on what authority the author makes so bold an assertion. There is no case on record, so far as we know, that a congenital idiot has ever been educated, or that a child under culture has ever been given a mental gift, outside the bounds of mental development prescribed by the constitution of his nature; moreover, when a child is born tone deaf or color blind, or an idiot as to mathematics, or any other primary faculty, there is no case on record, so far as we have been able to find, where the lost faculties have been regenerated in the subject's "flaccid brain." The mental elements are as fixed and stable in their individualities, according to our view, as are the physical elements in theirs, the species, the cells of sex, or sex itself; and it would appear to be as irrational to attempt to transpose gifts of special faculties, of reason and imagination,

a conception of the subject on which the medical profession are divided to-day. While every thinking individual will admit that it is difficult for a man with weak or defective brains to solve abstruse problems in mathematics or philosophy, they seem to imagine that one without brains altogether would solve them with more facility! Thus was explained the doctrine of obsession, or the seizure of the brain by an evil spirit or genii to exhibit traits of conduct and character altogether foreign to the natural traits and disposition of the person so seized. Mania found in this mediæval hypothesis a ready solution; homicides, suicides, the hysterical and kleptomaniacal and allied phenomena of mental perversion, likewise an easy explanation. So, too, the phenomena of ecstasy, trance, clairvoyance, divining, clairaudience, prophecy, inspiration, speaking in unknown tongues, the ravings of the religious, as St. John, Mahomet, Gautama, Swedenborg, Cardan, Paracelsus, etc., by which communications are supposed to be received from celestial sources, of no consequence, except the fact itself, through mortals, but not by mortals.

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or that of mathematics, or tone, or color, as to convert oxygen into hydrogen, or *vice versa*. The author's contention allies him with the advocates of spontaneous generation, which was effectively put at rest by M. Pasteur and others in the middle of the nineteenth century. When one seed or germ-organism can be converted into another there will be some foundation for Prof. Thompson's contention, and not before.

Good communications came direct from God and his holy angels; evil communications from the devil and his hosts of demons. Good thoughts were the inspiration of the Almighty; bad thoughts were the instigation of the devil. The brain was at best an instrument played upon by invisible agencies, disembodied genii of good or bad dispositions. These ideas were in harmony with the views and teachings of the mediæval period, which survived until long after the close of the period of the Renaissance. They are not quite extinct to-day.

It is not strange, therefore, that the science of mental physiology should not have kept pace with the advancement of chemistry and anatomy and general physiology. Nothing could be more natural than that it should lag behind. But the period of awakening to the importance of the subject was at hand. Willis was the first to conceive that the brain possessed a variety of mental functions; and Hunter, who came after Willis, held the same opinion. Hunter completely mastered the anatomy of the brain and its meninges, and with great minutiæ laid bare the secrets of its complex lobes, sulci, fissures, nerves, and other tissues. In this work he had many collaborators both in England, Edinburgh, and on the continent. Manifold were the results of his studies; but the most important of all was the declaration of his belief that in the brain were posited the centres of thought and feeling, and

that it consisted of a plurality of mental functions or faculties. To the wonderful genius of John Hunter, the self-educated, the great "mother-taught" anatomist and scientist, the world owes this unique and far-reaching generalization. Hunter died suddenly at the age of sixty-five, in the fulness of his genius and at the height of a career of usefulness almost unexampled in the annals of scientific men.

There had been written at this time, the first decade of the nineteenth century, many excellent treatises on general physiology, in all the languages of Europe; but so far as the writer of these pages knows, no work had been written upon Mental Physiology. The idea of thought being functioned in the cerebral substance, which consists of a little albumen, phosphatic salts, and water, totally devoid of feeling or sensibility itself, appeared to most physicians absurd. Was the Epic of Milton conceived by such a substance? Were the mathematics of Newton, or a Young, or a Huygens posited in salt and water and phosphorus? Was such the source of the genius of a Homer, a Hippocrates, a Plato, a Pythagoras, a Galen, and other divine lights of history and the world? It seemed absurd. Abercrombie's learned work on the "Human Understanding" did not embrace this hypothesis. The celebrated Locke might have done so, since that great man denied the subsistence of innate ideas. If the hypothesis is absurd to many men of intelli-

gence to-day, what must it have been to them in A.D. 1800?

So far as the annals of medical history show, the subject of plurality of mental functions in the cerebral hemispheres did not excite much comment until the appearance of Gall in Germany and his work on "Researches into the Mind and Brain," which set forth a new science of mind which he called "Phrenology," of which we have already given a brief account in the first volume of this work.[1] We hope the reader will not think, in view of the great importance of the subject, that a few more details are out of place here. Gall had been an indefatigable worker for a quarter of a century in mental science; but it was not until he began to give public lectures on his favorite theme that much notice was taken of him by the profession. This was in the first decade of the nineteenth century.

Dr. Gall's system of mental philosophy was based, as has been said, upon observed facts. It was a clear and logical induction from actual observation in which theorizing did not enter. His main contention was well founded, that the elements of character were indicated in the formation of the head; and was found at fault only in particulars in which explanations were ready. No observant individual will fail to detect the low and debased character in another, not only by the asymmetry of his head and features, but

[1] *Ut supra*, i., p. 347.

by the depraved and vicious physiognomy which he presents, and his ungainly manner and unsymmetrical movements; nor an individual of culture and refinement by the symmetry of his head and brow, and the grace of manner and movement. Nevertheless, it must be admitted that the line where one character shades off into the other may be so fine as to be misleading. Take, for example, the great Lincoln's head and physiognomy, personal manners, and ungainly walk. The greatness of the man and the sublime goodness of his heart, did not show conspicuously in his head and physiognomy. Many fine traits of his character were undoubtedly concealed in his uncouth exterior which was due to his lack of early culture, and backwoods life. It was in individuals of decided bent, one way or another, that the readings objectively of heads could be made with any positive degree of certainty and reliability, and only then by those possessed of keen perceptions. Character often lies deeper than the surface, too deep to find expression in cranial development, especially in individuals having no marked bent or traits of character. While this must be conceded, it must be admitted that the learned Gall's principal contention was true—is true,—namely, that the ill-bred, cruel, coarse and brutal, possess low heads, with heavy neck and large basilar region; that the aggressive, combative, quarrelsome, coarse, and vulgar have round heads with undue width between the ears;

that the kind, generous, and gentle possess high, narrow heads; that the lovers of pets, children, friends, and home, indicate that peculiarity by the prominence of the back-head, in the region of the occipital protuberance; that the spiritual minded have high heads, broad at the top; the debased, low heads broad at the base; that the observant have prominent eyebrows, the superciliary ridge; that the retentive memory is indicated in prominence of the central forehead—especially the historian's memory—the memory of events and facts; that the acute reasoners have wide foreheads; that the gifted in language and speech have prominent eyes, with width between them; that skilled draughtsmen likewise show a similar characteristic. These and a score or more of similar observations, descending to great minutiæ and particularity, were the result of many years of close and studious observation by Gall.

Dissections of the brain afforded little confirmation of Dr. Gall's hypothesis, except as to the connection of brain convolutions in general, and character. They showed a marked distinction in their development and proportion to the little brain[1], between the high-class type of men and the criminal class. The lower parts of the hemispheres were broader and thicker than the upper, or superior parts; their sulci less deep and the cortical layer less thick than in the brains of the higher-class type of men, all of which

[1] Cerebellum.

facts have received ample confirmation by subsequent studies of mental pathologists, notably those of Gall's countryman, Dr. Benedikt, in his remarkable studies of "Brains of Criminals." But too little was demonstrably known in Gall's time of the minute anatomy of the brain and its relation to character to justify all the conclusions of that rare student of mental science. His general proposition, that of the dependence of character upon brain, was demonstrably correct; the details which he claimed to be conclusively sustained by it could not be wholly substantiated then, nor can they be altogether now.

Dr. Gall, in pressing the practical claims of his hypothesis, committed an error very common to the enthusiast—that of confounding his own acute and almost marvellous sense of observation, which he had acquired by long and persevering practise, with demonstration. What he was able to demonstrate before an audience upon a living subject, as to the truths of craniology, no one else could do. The same may be said with truth of many of his enthusiastic coadjutors and followers. All know that the acute and cultivated observers of character are able to read in the face, or physiognomy, of persons their leading characteristics. The lines and features of the face reveal much to them that is obscure to the unobservant multitude. That which in a certain sense possessed the elements of a science to Gall

therefore, was no science at all to one uncultivated and untrained.

The corollary of Gall's mental philosophy was to predicate the various mental elements or traits in brain centres, each of which had a function distinct and separable from the others. According to the proportional strength and development of these centres and their relative influence upon their possessor, would the character be. If the basilar group predominated over the coronal, the individual would possess the instincts of self—and those of the savage, which knows no law but self-gratification. If, on the other hand, the moral group of centres or faculties were in the ascendant, sentiments of kindness, justice and honor would characterize the individual, and separate him from companionship with the low and vulgar. The distinctively selfish propensities when predominating (which are presumed to have their seat in the lower central hemispheres, above and behind the ears, giving their possessor breadth between them, and a round-shaped head) would necessarily constitute him aggressive, acquisitive, and combative; sensitive to his own interest, insensible to the interests of his fellows; a lover of athletic sports and conflicts, of personal prowess,—possibly rapine; sly, secretive, and alert for opportunities for graft and spoils, etc.

All the characteristics of the individual, in the Gallian system of mental science, are thus posited

in brain substance, as fixed as the bones in his body. The stronger, or predominating group necessarily rules motive and conduct. It goes without saying that the strongest motive dominates one's course and shapes his conduct and career. This conclusion is inevitable from the premise and is true—must be true, however it may affect the moral philosophy of the scholastic school, be the "bumps" and protuberances of the skull of an individual what they may.

Dr. Gall had many followers in Germany, as we have said, the most distinguished of them being his pupil, the learned brain anatomist Spurzheim. The medical profession, as a rule, did not accept his doctrine, nor concede the soundness of his hypothesis. They were too revolutionary, in the state of mental physiology at that time, for general acceptance. In the general incredulity with which his views were met at home, he took the proofs and demonstrations of his views to Paris, the Mecca of Science in those days, and presented them to the French Academy. That society appointed a committee to inquire into the verities of the subject, which finally reported unfavorably to the claims of Gall to have established a science. Nevertheless, Gall's visit at the French capital was not without good results. He acquired many followers in France, and subsequently in England and Scotland. At Edinburgh his doctrines were embraced by the eminent physician and writer, Dr. Andrew

Combe, whose work on "Infancy" was long a text-book in the medical schools. His brother, George Combe, also embraced the doctrines of Phrenology, and devoted his life to their exposition. Taking the subject to America in the early fifties of this century, he awakened great enthusiasm in Gall's doctrines, and made a host of converts.

George Combe was a man of unusual culture and refinement, and possessed affable manners and a warm personality, as well as a pleasing address. His lectures on Phrenology were very popular and awakened a wide interest. These lectures were published in book form and had a large sale. His most notable work was that on the "Constitution of Man," which was a semi-scientific book and one of great merit. It could be read to-day with profit by the interested reader.

The more notable followers of Combe in New York were Dr. R. T. Trall, founder of the Hygeio-Therapeutic College (1856); the Messrs. Fowler, the publishers—afterwards Fowler & Wells. The Fowlers were warm advocates of Phrenology, lectured much on the subject, and wrote many books in its advocacy.

Apart from Phrenology, Dr. Gall's labors were attended with a wide and wholesome influence on the physiology and pathology of the mind. They served to awaken an interest in a subject that had been persistently neglected. No work on

mental physiology had appeared in Europe before the time of Gall. It was not many years, however, before others followed, recognizing his services and accepting his fundamental contention. It may be said that no physiologist of to-day questions the truth of the hypothesis of a plurality of mental centres of thought and motion, of independent function in the brain and cerebellum, though they have but in a few instances been demonstratively located. Gall definitely determined, however, that consciousness and the psychic faculties and propensities, have their seat in the cerebral cortex; and that according to its degree of thickness will the strength and powers of an individual's mind be. To this proposition there are no exceptions. His hypothesis finds ample confirmation in monomania, partial idiocy, and local brain lesions, and also in geniuses in whom one gift is developed at the expense of other gifts. George Combe, for example, was one of the most intellectual of men, but he could not learn the multiplication table. The same was true of the great pulpit orator, Henry Ward Beecher.

It has been urged by critics of Gall's school of mental science, with much show of plausibility, that the mental faculties have been accorded places in the cranium where no brain subsists. For example, the organ of *vitativeness*, or "Love of Life," was located by O. S. Fowler on the mastoid process, which contains the organ or apparatus of hearing, and no brain at all. A yet more

notable instance of this seeming anomaly is the site of the perceptive group of Faculties, Form, Sense of Gravity, Dimension, Color, and Order. These organs are supposed to occupy the superciliary ridge. But the skull is double there, the frontal sinus intervening. No brain reaches within an inch of that location; yet any phrenological expert claims that he can demonstrate that an individual whose skull is prominent at that point has acute powers of observation; if the skull be unduly prominent there the individual has unusual powers of observation, and not if otherwise. So it does not appear to be a question of brain so much in practical phrenology as cranial projectures, or protuberances.

Again, it is urged that the most expert phrenologist may know nothing of cerebral physiology or anatomy; that he may never have seen a brain, and might not know one if he saw it; nevertheless, he will undertake to surprise an audience, for money, by readings of heads of people whom he never saw before, and correctly, in the main, delineating their characteristics, following the rules prescribed by Gall, aided no doubt, as was that philosopher, by their physiognomy. Every one probably has seen demonstrations of this fact. It would seem to the unprejudiced, therefore, that the term "physiognomy" (first introduced, we believe, by Bell),[1] or that of "craniology," would be more appropriate than

[1] See his work on *Facial Expression*.

phrenology, for the science of which the eminent and masterful scholar, Gall, was the founder.

The opinion of mental physiologists and alienists on this subject is divided. While the more distinguished of them at a later period conceded that the brain consisted of a congeries of mental faculties, many disputed the proposition that they could be located by studying the shape of the cranium. The celebrated Foville, a French writer on insanity, held to this view. It could not be expected that we should take sides in a discussion of this kind; nevertheless, it seems to us that the supporters of the hypothesis of Gall have the better of the argument. The very learned editor of Copeland's mammoth "Dictionary of the Medical Sciences" dissents from the bias of the author of that work, who seems inclined to Foville's views. Prof. Charles A. Lee, to whom we allude, says:

> From a somewhat extended examination of the doctrines of Phrenology, as taught by Gall and Spurzheim, we have been led to believe them founded in nature, and in harmony with the best established principles of physiology and philosophy, and of primary importance to the physician who desires to make himself acquainted with the causes, seat, and treatment of disordered intellect. . . . It must be admitted that the mind is endowed with a plurality of innate faculties; that each of these faculties manifests itself through the medium of its appropriate organ, of which organ the brain is a congeries; and

lastly, that the power of manifesting each faculty bears a constant and uniform relation, *ceteris paribus*, to the size of the organ, or part of the brain with which it is more intimately connected.

And he quotes an elaborate argument to support his view, from Guy's "Principles of Forensic Medicine."

To Gall and Spurzheim and their followers [continues Professor Lee] is due the great merit of having directed attention to those faculties which are the real source of action—the emotions and passions; and to them must be ascribed the praise of having originated the simplest and most practical theory of the human mind. [A better phrasing would be, having *discovered the real basis and operations of the human mind.*] The phrenological question of the mutual relation existing between certain parts of the brain, certain faculties of the mind, and certain developments of the cranium, may be still a matter of doubt, and the practical advantages accruing from a knowledge of these relations, a subject of controversy; but of the soundness of the theory, that the mind is a congeries of organs or faculties capable of either acting alone or in combination, varying greatly in power in different persons and in the same person at different times, there can no longer be any reasonable doubt. Admit the theory of separate existence and possible separate action of the several faculties of the mind, the reasoning faculties, the emotions or sentiments, and the passions or propensities, and it is not more difficult to imagine a moral than an intellectual insanity.

Allow that the several faculties, originally of different power in different persons, may act in combination in many different ways, and we have the materials of an almost infinite variety of character, the key to endless diversity of opinion, and the explanation of all that is most obscure in the motives and conduct of men.

If it be conceded [the writer goes on to say] that the brain is the organ of the mind, and that the mind is composed of various faculties, capable of acting alone, or independently, as well as in combination, it follows as a matter of course, that different portions of the brain must be allotted to the different faculties as their appropriate organs. On no other supposition can we account for the existence of partial geniuses, partial idiocy, monomania, or the phenomena consequent on wounds inflicted on different parts of the brain.

The theory, then, of separate faculties, originally of different power, susceptible of improvement by education and habit, and of different degrees of excitement from causes acting from within the body itself, or from without, manifesting themselves sometimes alone and sometimes in combination with the faculties, is the theory which best agrees with reason and experience.

We need only add that subsequent experience and observation have not confirmed the details of Gall's system; but that they have confirmed his principal contention. The brain has been found to be a more complicated organ than Gall or any of his adversaries and confrères knew it to be.

The State of Mental Pathology

In regard to mental pathology (Psychopathy), it could not be expected that much should be known of it until mental physiology (psychology) should have been developed. Accordingly, in the beginning of the nineteenth century, the study of the abnormal side of the mind was almost wholly neglected. Pinel, it is true, began his study of insanity in the previous century, and published an important work on the subject toward the close of that century (1791). He may be regarded as the first physician to hold just views of mental alienation, and to have had the courage to announce them and to put them into practice.

The acute diseases of the meninges of the brain and various tissues within the head, the apoplexias, etc., were treated, like other maladies, upon general principles; but one whose mind was wrecked, who had lost his mental poise and balance, who was a prey to delusions and hallucinations, was *insane*,—that is to say, mentally unhealthy. He had gone mad. No physician was supposed to be able to minister to a mind diseased. Such a person was turned over to the ecclesiastics, to be treated by a priest and sorcerer or obsessionist. If he proved to be intractable and obdurate he was sent into exile like the leper—into a retreat, an asylum; there to be kept in close confinement, until the evil spirit, weary of its ravings, took

itself away, or carried its unhappy victim off to the shades of Pluto.

Asylums had long since been reared in all the civilized states of Europe for the confinement of lunatics. Into these rude structures, constructed in the cheapest manner, without any of the comforts of civilized life,—prison cells were they in which but little light or fresh air ever entered,—hordes of this unfortunate class of patients were crowded together. No distinction between the curable and the incurable was made. The violent and mild were huddled together; the male and female often mingled in the same apartment, and slept, or passed the night, on the same pallet of straw. Here long rows of howling maniacs of the destructive, intractable type, might be seen chained together, and fastened to the floors and walls of the building in which they were confined; here, too, might be seen hordes of human beings, innocent of all crime or misdemeanor, save that of being *mad*—of inheriting the effects of parental vices,—wallowing in filth, alive with vermin, in rags insufficient to cover their nakedness; served with food barely fit for beasts of prey, with no means of bathing, of exercise, of diversion or recreation or amusement, or communication with relations and friends—all sunk in direst, pitiless woe, with nothing to look forward to or to expect, but the blankest despair. It was a common saying that "whosoever passed the threshold of one of these asylums was considered lost." A line in

Dante's "Inferno" might properly be written over the door, "Lacerate ogni speranza voi ch' entrate."[1] Of the care and treatment of the insane at this period, the eminent German alienist, Griesenger, in 1845, wrote:

> This was the fate of the insane in many places until very recently. Even so lately as 1833–34, in some provincial towns in France, they were confined in prisons; in several English institutions entire rows of them might have been seen in chains; and even to the present day, in a few remote districts, their apartments are coarse, stall-like enclosures of the strongest and roughest construction, before which vacant curiosity stands to irritate the madman.[2]

When Burns wrote that "man's inhumanity to man makes countless thousands mourn," he probably referred to other inhumanities,—for heaven knows there were others horrible enough—than such as were inflicted upon men and women for the offence of insanity. Yet he must have known of its horrors. It is a chapter of history the saddest to the philanthropist, the most disgraceful to humanity, and the most humiliating to the profession of medicine, that we have to write—not excepting the horrors of the Spanish Inquisition, or the massacre of St. Bartholomew. The Inquisition made short work of its victims; Bartholomew was the work of a night, and the victims were soon relieved—by death. But the

[1] "All hope abandon ye who enter here."

[2] *Mental Pathology and Therapeutics*, p. 506.

asylum, into which the unfortunate wretches of misery were incarcerated was a place of torture too horrible to describe or to believe. Whosoever entered there was lost. The doors and such windows as the enclosure possessed were barred with iron. Its victims were despised of man and forsaken of God. Common decency was denied them. No mercy was shown them. Their cries and pleadings fell upon ears deaf to sympathy. No outstretched hand was there to help or comfort. To them, even the sunshine and blue sky were denied, and all in deference to a belief, long inculcated and bred into the heart of humanity, that the victims of insanity were suffering the just judgments of God, for some concealed sin, or hidden crime committed either by themselves or their fathers and mothers! It is no wonder that the prejudice against the name "asylum" should remain in the heart of humanity. In America it has been dropped, and the term hospital substituted in its place. "Hospitals for the Insane," these institutions are now called. It may not be devoid of interest to inquire into the cause or causes of this dreadful inhumanity toward the insane.

First, the primary cause of the cruel and iniquitous treatment of the insane may be found in the false conceptions of the leaders of public opinion in the early centuries of Christianity, of the causes of morbific mental phenomena. It was their habit to refer all causes of the mundane

to agencies divine or devilish; and to enforce their views by appeals to superstition. All know what a dreadful power that was to invoke among people ignorant and credulous—what it is even to-day. Few there are who are insensible of its influence for good and evil.

Second, the mind of the public was thus misled and its judgment corrupted by this false belief, which engendered an instinctive fear and horror of the insane. The fear of and aversion to their presence were stronger than that to a mad dog, or to a disease that was contagious. This fear infected the populace and influenced public sentiment. It overwhelmed the sentiment of humanity and inspired means and methods of public safety only. The interests of the afflicted were not thought of—they were not worth while. They were as if dead to their friends and the world; to be put away, out of sight and mind. Why try to make them comfortable? Or to shelter them from the elements? They were nursing an evil spirit. It was not worth while to build places in which to confine them solely for protection of the public, at great expense, and to furnish them with comforts which they could not appreciate and enjoy. Let them rather be places of warning to the living lest they too become victims of the evil one, and merit a like fate.

We find in Maudsley's "Physiology and Pathology of the Mind" (among the first works to be written on this theme) a view of the

subject in accord with our own, which we transcribe:

> Whether these unjust feelings (on the part of the community) were legacies from that ancient superstition which regarded an insane person as tormented with an evil spirit in consequence of some great sin committed by him or his parents, it is needless to inquire here; suffice it to say that the cruel suspicion and fear inspired a most cruel practice. To shut the insane up from gaze and, if possible, from memory, to be rid at any cost (say, rather, the smallest cost) of their offending presence,—that was the one thing to be done; and fit implements were not wanting to do it; consequently, it happened that infinite cruelties grew up and flourished under the influence of false views and hostile feelings with regard to them; and to be the victim of the most pitiful disease became a reason, not for undergoing proper medical treatment, but for enduring the severest punishments. The memory of this iniquitous past [continues Maudsley] is thought to justify, and certainly strengthens, the public jealousy of asylums, and those who superintend them now; they are weighted with an inherited odium; and a stringent legislation, designed to mitigate the uneasiness of the public conscience on account of the real horror of the insane which is still felt, and to condemn past sins, does not conduce altogether to their best interests.[1]

In this closing clause the felicitous author refers to the precaution of legislatures, lest, as heretofore has been done, persons innocent of the malady,

[1] P. 423.

but whose eccentric habits render them obnoxious to their relations, may be sent to the asylum—for convenience of the family.

Third, the ignorance of the profession as to the nature and etiology of insanity was a predisposing cause of the neglect to care for those afflicted with mental diseases. We have seen that mental physiology, or a knowledge of the functions of the brain was in an undeveloped state; the pathology of mind was accordingly a theme almost totally neglected. The medical mind had not altogether unshackled itself from the fetters of a past age and a false philosophy; and until it was absolutely free to think and investigate, advancement in brain pathology could not be expected. The medical had fought the ecclesiastical profession from the beginning, as we have pointed out, and it was not yet through with the struggle. Many were still dubbed atheists, and referred to as the "hated infidels," and their followers often warned against their teachings by the clergy, and even of employing them in their families. In the early century, however, light began to enter the dark places of superstitious jurisdiction; and a few of the profession, animated by a courage equal to their conviction, essayed reforms in the treatment of the insane which ultimately led to an amelioration of their condition. Instead of herding the insane of all classes, like cattle, into the rudest of accommodations, presided over by an ignorant overseer, better structures began to arise in charge of

physicians, and the introduction of more humane management, and decent, if not skilful treatment. St. Luke's Asylum, London, England, late in the eighteenth century (an excellent and appropriate name, since Luke himself was a physician), was the first institution of the kind established with the avowed object of curing the disease. Some time later another asylum for the cure of insanity was established at York, England. This was erected especially for the Quaker lunatics. These were followed by a similar institution in Germany, the first of this century, under the auspices of the eminent Alienist, Langerman.

Referring to the progress of reform in the care and treatment of the insane in Germany, Griesenger observes:

In Germany, where theoretical psychology was almost entirely devoted to the discussion of abstruse questions, such as whether insanity is the result of sinfulness, or whether in insanity the body or soul is diseased, practical efforts have almost in a single season been made the chief regulators of asylum practice, and that with the best results; and in this matter Jacobi's exertions to introduce the English practice into Germany have had an unprecedented and most beneficial effect.

And the author complains that the new system of management was greatly hampered and embarrassed by frequent introduction of trifling questions

of a psychological nature.[1] Nevertheless, the progress made was very satisfactory.

The reform of the care and treatment of the insane, to which we have referred, and which was at this period fairly under way, was inspired by members of the medical profession, aided by a few philanthropic gentlemen, with both sympathy and means; it found little support and encouragement from the general public—often bitter opposition and ostracism. The prejudice against a person whose mind was diseased, the disgrace attached to madness, the social taint of the disease, made the reform slow and wearisome.

> How often did Pinel appeal [says Maudsley], and appeal in vain to the authorities, before he was permitted to make the experiment of removing the chains from a few lunatics, and of treating them with kindness and consideration! Against what an embattled phalanx of obstructive prejudice, selfish indifference, and interested opposition did the humane system of treatment, the conception and realization of which were not with the people, but in spite of them, win its slow way to general adoption in this country![2]

The author was speaking of Protestant England. If such was the popular feeling in England, what must it have been in France and Italy, both Roman Catholic countries? We shall see.

Of all the countries in Europe, France was the first to embrace new and untried ideas—especially

[1] *Mental Pathology and Therapeutics*, p. 422.

[2] *Op. cit.*, p. 423.

after the Revolution of '93. It was in France that the celebrated Pinel, moved solely by consideration of humanity, began his efforts to improve the condition of the insane. It was during the Revolution that he began his work at the peril of his life. He first devoted his attention to lunatics confined at the instigation of the public authorities. "In consequence of this interference," he writes in his diary, "I was stigmatized as a moderate and an aristocrat—names at that time almost synonymous with a sentence of death. Undeterred by this, Pinel presented himself before the Town Council of Paris, and with renewed energy solicited them to sanction his reform. "Citizen," said Couthon to him, "I shall meet you to-morrow at Bicêtre, and woe betide you if you have deceived us, and if under the name of fools you have concealed the enemies of the people!" Accordingly, Couthon made his appearance; but the cries and howls of the madmen, when he first attempted to interrogate some of them, were too much for him, and he said to Pinel: "O citizen, art thou, thyself, a fool, that thou wouldst liberate such animals? Do with them what thou wilt, but I am much afraid that thou wilt become the victim of thy rashness." Nevertheless, the same day, Pinel began his task and struck off the chains of a number of patients.[1] The example of Pinel, says

[1] *Mental Pathology and Therapeutics*, p. 406, William Griesenger, M.D. Translated and published by the New Sydenham Society, London, 1867.

Griesenger, gave the impulse "to a complete renovation of the treatment of the insane.' 'The reform spread ere long all over Europe and led to the establishment of special institutions for the cure of insanity, and to a separation of the incurable cases from the curable. Germany took the lead in this reform movement, and within a quarter century could boast of a score of model institutions (for those days) for humane care and treatment of the insane.

This humane achievement for the care of the insane, inspired by members of the medical profession, belongs to Pinel more than to any other man. It was a labor on his part purely altruistic, and brought him neither fortune nor ease. He had already distinguished himself as an anatomist and secured renown by the discovery of a gland in the brain, which bears his name, and which Descartes imagined to be the seat of the soul. But his life was devoted to the insane and the study of insanity. He wrote the first treatise on "Mental Alienation" that had appeared in any language treating the subject along scientific lines. Subsequently he became the chief physician at the Bicêtre Hospital, Paris, and a member of the Institute of Science. The work by which Pinel is best known, however, is his "Philosophical Nosography" ("La Nosographie Philosophique"), which ran through many editions, and aided greatly to advance the knowledge of the Physiology and Pathology of the Mind. Pinel was born

in the Department of Tarn, France, in 1745, and died at Paris in 1826.

But Pinel had an efficient and distinguished collaborator in his work in Jean Etienne Dominique Esquirol, who was born at Toulouse, France, in 1772. As a student of medicine his specialty was diseases of the mind, on which subject he gave a course of clinical lectures at Paris in 1817. But already he had established at Paris, in 1799, what was said to be "a model institution" for the care and treatment of insanity. Like Pinel, Esquirol was inspired in his work by his love of humanity, in which he was pre-eminently successful. Esquirol was made chief physician at the asylum at Charenton, in 1826, and subsequently published a treatise on "Diseases of the Mind" ("Des Maladies Mentales"), in two volumes, which was an important contribution to Psychological Medicine. He also became a member of the Paris Academy of Medicine. His death occurred in 1840.

The medical treatment of the various forms of insanity at this period was nil. They were not supposed to be cases to which medicine was adapted; restraint and compulsion even to the infliction of death for incorrigible obduracy was the treatment in vogue. The "strait-jacket," the straps, the iron bars, close confinement, handcuffs, chains and ropes and the chain-gang were the principal means and methods of discipline. The treatment did not differ materially from that

of criminals or other offenders against the laws of society and public order—except that it was more strict and severe, and administered by persons, "overseers," ignorant and irresponsible. Later, however, when the profession awoke to the subject, and came to understand the true significance of a mind diseased, reforms of a revolutionary character were introduced. When they came to realize that the insane were suffering from an organic disease, and were in consequence more entitled to humane care and treatment than people in a normal state, they were given more liberty to move about and to enjoy the outdoor air and sunshine. Ropes and chains and strait-jackets were less in evidence; but the last was still a necessity for the raving maniac, and continued to be an accessory of treatment down to within the memory of men living, when the camisole took its place.

Following the introduction of improved surroundings, of sanitation and means of personal cleanliness, separation of the sexes, and the curable from the incurable, and the classification of the varieties of cases of insanity, the next consideration of Pinel and his coadjutors was their medical treatment; and they were not slow to discover that the principles of medicine were as applicable to them as to other classes of diseases; and that there were medicines with qualities that could minister to a mind diseased, remedies that mollified suffering, promoted rest and sleep, that allayed terror

and excitement, and comforted the distressed. Long before the death of Pinel the agencies of the materia medica and hygiene were freely employed in the treatment of the various forms of mental alienation. The truth had been rediscovered that man was a unit, body and mind, soul and substance; and that maladies that affected one, affected the other likewise; and that the principles of treatment applicable to one, were equally applicable to the other. It marked a great advancement in science and philosophy as well as in the humanities, and in the conception of the scope of the art of medicine.

Both of these great physicians, Pinel and Esquirol, achieved a position in Medicine that time may dim, but never efface. Their names are inscribed in the Temple of Medicine. Honored they were with memberships in associations of the learned, academies of science and art, etc., which are not to be lightly esteemed; yet one cannot forget that a notorious adventurer received similar honors for exploiting the specific virtues of Peruvian bark in England a half-century before; that he was knighted by the Government and given a monument at Cambridge!

SIXTH: PERIOD OF THE NINETEENTH CENTURY

(*SECOND DECADE*)

CHAPTER XII

An Era of Sects and Sectaries

HERE we allow ourselves to be temporarily diverted from following the course of medicine proper, to give a brief account of some phenomena in medical development which are not without significance. We refer to the phenomena of pseudo-psycho-therapeia, as exhibited in Mesmerism, Mental Healing, Perkinism, Christian Science, and other forms of Suggestive Therapeutics, which create so great a furore from time to time. Of all the fads medicale, that of Perkins's Metallic Tractors was perhaps the most famous in its day—and the most absurd. It arose toward the close of the eighteenth century—the beginning of an era of quackery.

The inventor of this little instrument known as Perkins's Tractors, which seemed to possess wonderful curative powers in certain cases, was Elisha Perkins, who was born in Connecticut in 1740.

He became a practitioner of medicine in due course of events in the country town of Pomfret. His reputation was excellent for probity and honor; and while professing no claims to learning or scholarship, he held the respect and esteem of his neighbors. The electric craze of that time agitated the public mind, excited by the experience of Franklin and his kite, and the wonders performed by Mesmer at Paris by personal magnetism, which stimulated the ambition of this well-meaning Connecticut Yankee to himself devise something in the electric line. Accordingly, he adjusted two short strips of metals, one of zinc, the other of copper, blended together at one end and branching apart at the other in the form of a compass, by which he was able to produce an electric current by bringing the two ends in contact with a conducting surface. He then conceived the idea that it might be useful as a remedy in disease, particularly rheumatism. He soon had an opportunity to put the instrument to the test of experiment, which, to his joy and surprise, was successful. If it were adapted to one class of maladies, he thought, why not to other classes. Further experiments were as successful as the first. Indeed, all classes of chronic maladies yielded as by magic to a few strokes of the tractors. Naturally he was amazed; and being a credulous sort of person, ignorant of the relations of the sympathetic nervous system with the cerebro-spinal, he began to believe that the virtues and properties of the

little tripod which he had devised were real and genuine. The news of his invention spread like a contagion, and produced the wildest enthusiasm throughout the country. Hundreds visited the doctor, seeking aid from all sorts of ailments; the bedridden woman, who had suffered many things from many physicians; the helpless rheumatic with deformed spine, crooked limbs, and stiff joints, besought a visit from him to be stroked by the little instrument. The poor man was soon overrun by calls at his office and pleadings for visits from abroad. The contagion soon spread to New York and the Eastern cities, and in most cases the strokes of the tractors were attended with relief from suffering, if they did not cure the malady outright. The preceptors of the older members of the profession of to-day remember the circumstance well; and it is one of those, long since dead, to whom the author is indebted for some of the details of the foregoing. Not satisfied with the success which he had achieved in New York and New England, Dr. Perkins sent his son to Europe with the magic instrument. The travel of news was slow across seas in those days, but, nevertheless, the wonders of the invention had preceded him, and people of all parts were awaiting his arrival with avowed curiosity, if not real. "The operation was termed 'Perkinism' by the Faculty of Copenhagen in honor of the inventor; and institutions were formed in Great Britain, which were regarded for a time—

that is, during the existence of the delusion—as sources for the dispensation of health to suffering thousands."

The report of the Perkinistic Committee of one of these institutions says: Mr. Perkins, son of the proposer,

has annually laid before the public a large collection of cases, communicated to him for that purpose by disinterested and intelligent characters from almost every quarter of Great Britain. In regard to the competency of their vouchers it will be sufficient simply to state, that, amongst others whose names have been attached to their communications, are eight professors in four universities, twenty-one regular physicians, nineteen surgeons, thirty clergymen—twelve of whom are Doctors of Divinity—and numerous other characters of equal respectability. The cases published by those gentlemen in March last—the date of Mr. Perkins's last publication—amount to about five thousand. Supposing that not more than one case in three hundred which the tractors have performed has been published—and the proportion, probably, is much greater—it will be seen that the number to March last will have exceeded *one million five hundred thousand!*

This was in 1802.

The learned Dunglison, himself an Englishman, one of the best scholars and most distinguished medical writers and professors that America ever possessed, who was a small boy at this period, made this observation of the Perkins movement:

With such apparently overwhelming evidence in its favor, can we be greatly surprised that sufficient enthusiasm should have been excited amongst the credulous for the establishment of the Perkinistic Institution? A meeting was called for the purpose; the undertaking was unanimously resolved upon, and a subscription opened to carry the proposed charity into effect. The list was soon honored by above one hundred subscribers, several with a donation of ten guineas, and only one or two subscribing annually less than one guinea. Lord Rivers was elected President of the Society; and eleven other persons of distinction, among whom was Governor Franklin, son of the illustrious Franklin, composed the list of vice-presidents. On the 25th day of July, 1803, a large house was opened in Frith St., Soho Square for the reception of patients and in which the medical attendant, matron, and servants constantly resided. The objects of this establishment, as stated by the Society in its publication on the subject, appeared to be philanthropic, and were as follows:

First, to afford relief to the disorders of the afflicted and industrious poor of the metropolis, if the remedy should be found capable of that desirable purpose; and

Second, to submit the long controverted question on the merits of the Metallic Tractors to the test of the severest scrutiny, the ordeal of experiment by disinterested persons and thereby enable the public to form a correct opinion on the just pretensions of Perkinism;—and, it was further proposed, in the report of the Committee, that the British Parliament should investigate the merits of Perkinism, and if

convinced of its utility, honor it with similar patronage to other modern discoveries for the benefit of mankind. Yet [says Dunglison] humiliating reflection! In a very brief space of time the enthusiasm and the Institution died away. All its supporters were only too anxious that the affair and their connection with it should be forgotten.

The delusion was dispelled by an act of a skeptic, Dr. Haygarth, and by a simple contrivance, as simple as the tractors: He adjusted two pieces of wood in the form of the tractors, painted of the same color so as to closely resemble the original, and applied them to sick persons, "who had been previously prepared to expect something extraordinary," with equally wonderful results. He applied his wooden device upon all sorts and conditions of patients with curative effects which were astonishing. "Obstinate joints of the limbs were suddenly cured. Joints that had been long immovable were restored to motion; and, in short, except the renewal of lost parts, or the change of mechanical structure, nothing seemed to be beyond their power to accomplish."[1]

The secret was out! The charm broken! It was not metallic tractors at all that had been working such wonders among the sick and decrepid; it was Faith; Belief; twin supports of cults and fads,—acting through the cerebro-spinal system of nerves down through the sympathetic nerves and ganglions of the lower physique, by

[1] Bostock, *op. cit.*

which the healing power had come. When Belief was gone the *vis medicatrix naturæ* became inoperative; the Φύσις of nature settled back to its state of nonactivity, and the poor patient had to return to rational means and methods for relief of his disorders, which, if not speedy in producing curative results, are as speedy as they ought to be, —as speedy as in the wisdom of Nature they could be, and as permanent in their results.

Chronic ills of the human family are of long standing. Their causation reaches back to our great-grandfathers and great-grandmothers, and perhaps to theirs and theirs. The sick who are learned and wise will obey the divine laws of their being, and feel assured of beneficial results. Some maladies are too deeply inbred in bone and sinew, brain and nerves, to be uprooted by false promises, however finely and speciously phrased, or artfully the tricks are formed and played.

Perkinism had a remarkable vitality, surviving its author several years; but at last the delusion being exposed, it collapsed like a bubble.

Ere long, however, England was afflicted with another semi-delusion which was destined to disturb the tranquillity of the medical profession for an indefinite period. We refer to the introduction of Homœopathy, to the rise of which we have already referred. Homœopathy, as has been seen, was exploited by its learned author in Germany late in the eighteenth century, and into France a few years later—but its publications

being in German, had not reached English speaking people. About this period a translation of Hahnemann's "Organon of Medicine" (Organon der Heilkunde) was being read in London by many sympathetic minds. The love of mystery and the marvellous had been allayed somewhat by the great shock it had received from the sudden collapse of Perkinism, but it was not "scotched." Homœopathy soon became a welcome guest in the families of reputable people in London, despite the denunciation most bitter and violent, from the members of the regular profession. And we must confess that from the point of view of the medical mind of that time they were fully warranted in denouncing the practice as absurd and silly, and its practitioners as fools or knaves. Fools, if they honestly believed it; knaves, if knowing its doctrines, they practised it. And when one considers the quite infinitely attenuated dose that its practitioners prescribed: two globules of sugar of milk, the size of a millet seed, moistened by an alcoholic dilution of the thirtieth potency, which constitutes the decillionth dilution of the drug, one cannot help sympathizing with the sentiment expressed, nor of sharing in the disgust of the medical mind. The potentiality of the infinitely little had not then been inquired into; nor had Hahnemann penetrated it. His system of dosage was based, not upon any knowedge of microscopic life, for there was none at that time, but upon an hypothesis pure and simple, of dynamic forces,

which was not especially entitled to the respect of minds well trained in observation and chemical philosophy. On the other hand, it must be conceded that the dosage of the Hippocratians was generally not only heroic, but monstrous. They were difficult to take, especially by children; and when the opportunity was offered of the small dose, so simple and harmless, which a baby at the breast could swallow, and recover, the good wife and the kind father put away reason and philosophy and accepted it. What cared they for the dose or doctrines so long as they recovered from their ailments promptly, and with the least annoyance? The problem involved in the action and effects of medicaments in big doses or small, was beyond them in any event.

The force of the foregoing reflections will be perceived readily in the following anecdote: John Garth Wilkinson, a reputable physician of regular medicine, of London, relates in his clever little book on Homœopathy of how he came to be a homœopath. One of his children was taken with a croupy cold one winter's night, and he prescribed a dose of ipecac for it. But the child was cross and intractable and would not be induced to take the medicine. In vain the mother coaxed, tried to bribe, and then to force the child to swallow the dose; but the child continued obdurate. Finally, she appealed to her husband, the doctor, who unconcernedly was asleep in bed. "Dr. Wilkinson," in despair, she cried; "if you wish

this child to take this dose, get up and give it yourself." Whereupon he arose and went through the same fruitless experience that his wife had passed through. "Now," said she, "our neighbor, Mrs. —— has a doctor who gives little sugar pills that the children cry for when ill. They are so easy and pleasant to give and to take. Why can I not employ him to attend the children?" To this argument, Dr. Wilkinson, after much opposition and several experiences such as the above, yielded, and allowed his wife to have her own way, with the result ultimately of his adopting the practice himself and becoming a warm advocate of the system.

Physicians, professedly devoted to the scientific method, with questionable reason, it seems to us, have declined to recognize these agencies of therapeutics, or to admit them as legitimate and reputable means of curing diseases. One cannot but respect the position they assume while questioning their justification; for Mental Physiology and Pathology show that the system of nervous energy to which the psychic elements of Faith and Belief are related have an organic predicate in the sympathetic nervous system of man, capable of exerting a powerful influence upon the system generally, in health and disease.[1] Through the influence of belief that system is energized by the cerebral. This is a comparatively modern discovery—within the latter half of the present

[1] On this subject see Prologue to this work.

century. Its existence to-day admits of no question. It is hardly a procedure sanctioned by Science, nor therefore by propriety, to ignore it, or to fail to give it recognition and to profit by it. It is rather placing oneself in an unscientific attitude not to do so. The profession was clearly within the bounds of its dignity and propriety in its position of skepticism as to the scientific basis of faith cures, and the claims of ignorant pretenders, who ought to have been in better business, in the absence of demonstrable knowledge on the subject; but the situation is now changed; and however difficult it may be for the old members of the profession to put away their prejudices and recognize truths, in respect to psychological therapeia which have been demonstrated since their college days, to have a basis in the sympathetic ganglia, they should make haste to do so. The Studies of Daniel Hack Tuke have placed this subject in clear light.[1]

Moreover, the profession has a duty to do in this matter. It devolves upon it to define the limits to which psycho-therapeutics is applicable and its use justifiable; that the reputable and conscientious workers in this department of Medicine may know where they stand; whether it be with ignorant quacks and charlatans, or among the learned, who have a supreme respect for Science and the verities. The danger now is that a large and reputable class of well-meaning

[1] *Influence of the Mind on the Body.*

people will drift back to Imposture Medicine, which was practised by the monks and priest-physicians of the mediæval period, so destructive of science and philosophy, as we have taken pains to show; and that the medical profession will have the battle of truth against error in high places to fight over again. Indeed, this retrograde movement has already begun; the infirm are already seeking the churches for their pious ministrations, in which so-called "Suggestive Therapeutics" and prayers by regularly installed and "ordained" practitioners of the cult, of both sexes, are officiating. Charlatanism was never more prevalent among Anglo-Saxon people than it is to-day. The profession has fought it, not in its own interest, but in the interest of the public against itself, just as it has fought other evils that prey upon the public health and welfare, such as physicians without an education, with or without a diploma, or license to practise on the gullible, nevertheless unsuccessful in driving charlatans of that class out of business altogether. It has raised the standard of education, extended the term of preparation of its students for college and requirements of graduation to the end of dropping aspirants for the profession from the college rolls, the unworthy and incompetent by nature, and securing a higher grade of medical students and physicians. Now they have to contend with the same evil in a more refined and specious form.

We have no desire to speak otherwise than in

terms of respect of the learned and distinguished founder of Homœopathy and of the distinguished medical men who became his followers, and have advocated with such great ability and industry the claims of Homœopathy to equal recognition with the old, or Hippocratian School of Medicine. Many of them we have known personally, and can speak with personal knowledge of the high and philanthropic zeal with which, for the most part, they have been animated. That many of them have been moved by motives of ambition, and the hope of gain and position for themselves was to be expected, since they were human. In that respect they shared the desires and ambitions of the great majority of medical men of ancient and modern times. There is but one Hippocrates, one Aristotle, one Galen, one Boyle, one Haller, one Good; but there are hosts of eminent men in the annals of medicine, who, if they did not reach the altruistic dignity which ought to have been theirs, achieved an eminence for probity and honor which entitled them to the respect and gratitude of mankind. We hold them in the highest respect, absolutely, without regard to their religion or pathy. At the same time we cannot but feel that the founder of Homœopathy committed a grievous error in not contributing the fruits of his genius to Medicine, as a free offering, and there to have left them for further fruition in their season. There can be but one system of medicine, broadly speaking, and that a scientific

one. Surely, science is broad enough and extended enough in its scope to embrace all the truths of medicine. The great masters in its fold have sunk themselves in medical science and art, neither caring for nor seeking personal—we were about to say immortality—let us rather say, fame. In doing so they achieved an immortality that will endure as long as the earth endures. The rank and file of the profession have not been equal to this altruistic sentiment, but have pursued a different course. Nothing was more natural; no higher course was to be expected of poor human nature. Instead of building one grand Temple of Medicine, with a niche for every phase of scientific thought, there have been built scores of frail, half-conceived structures, in which have been posited the views of warring sects and factions, to be overborne by every change of public opinion, and replaced by others equally frail and untenable. The consequences have been derogatory to the dignity of the profession and have retarded the advancement of the art and science of Medicine.[1]

The practice of medicine had degenerated since Sydenham and Boerhaave by neglect of the pre-

[1] Mr. Abraham Flexner's investigations of the Medical Colleges of the United States in 1910 show a disgraceful state of things. He found five times more of such institutions than were needed, and that a large majority of them were poorly equipped and a disgrace to the profession. See his report and recommendations to the "Carnegie Foundation," New York, an abstract of which was published in *The World's Work* for July, 1910.

cepts of the masters—namely, study and observation of the phenomena of morbid states. We have said elsewhere that in the beginning of the nineteenth century medicine was in a state of impassibility. But it was really worse than that. It had made no substantial progress in a quarter of a century; and when a system or science ceases to progress it retrogrades. The habits of observation and induction were neglected. They needed to be revived. On this subject the learned Dr. Gregory, of Edinburgh, forcibly observed:

A glance at the history of Medicine exhibits that the Science has suffered more from faulty observation than from faulty theories. It will generally be found, indeed, that theories have been based upon faulty observation. From the manner in which empirics of all ages have conducted themselves, it is not surprising that their writings have tended so little to the advancement of the art; and that, on the contrary, they have had the greatest share in encumbering it with the many falsehoods under which it has labored so long, particularly that important branch which relates to the effects of Medicines. . . . A physician [he continues] of real knowledge and practice may draw instruction or catch hints from facts related in an imperfect manner, which will either be useless, or tend to mislead others who have not these advantages. To such, all the circumstances relating to the exhibition of a remedy can never be too distinctly specified.

And in the same vein of observation and criticism the learned Robley Dunglison declared:

It is easier, however, to *observe* than to *think;* hence the number of persons who restrict their attention mainly to the contemplation and classification of morbid results, without reflecting whether, or in what manner, they may lead to the saving of life, or the alleviation of suffering,—without seeming to give a thought, indeed, to these all-important results. Such individuals would carry the science of medicine back to those periods when the ancient empirics "saw without discerning, administered without discriminating, and concluded without reasoning."

The mere observer of phenomena, who thinks not, is but the unenviable counterpart of him, who

> "Saw with his own eyes the moon was round,
> Was also certain that the earth was square;
> Because he had journeyed fifty miles and found
> No sign that it was circular anywhere."[1]

The absurdities of many of the Hahnemannian doctrines, the extravagance of the claim of their advocates, although logically predicated on those doctrines, must be apparent to every one who examines them in the light of science. The use of the extreme infinitesimal dose is an absurdity

[1] *Therapeutics and Materia Medica*, p. 39. The late Prof. Dunglison admits that "Homœopathy has certainly tended to impress upon us still more strongly the well-known, but too often overlooked truth, that all diseases do not require the employment of energetic disturbing agents; and that many of them will proceed more satisfactorily toward health under judicious hygienic care, without the assistance of any medicine. Rational therapeutics has, therefore, benefited by homœopathy notwithstanding the follies of the doctrine."—*Ibid.*, vol. i., p. 91.

on a par with Perkinism. It is an appeal to blind, unreasoning faith, which is possessed only by the ignorant and credulous. We are referring, of course, to the homœopathy of the period of which we are writing—Hahnemannian homœopathy; the homœopathy of the "Organon of Medicine," which is mostly obsolete in this. Nevertheless, it exerted a most salutary influence upon the practice of regular medicine, in so far as to show the evils of massive doses of drugs in cases where small doses would be wiser. The leaders of the dominant practice were strangely slow to perceive and admit the errors of their course. The pride of opinion, the odium of fallibility, or being thought capable of making a mistake or holding to a false proposition constrained them. Had they been familiar with the precepts of Hippocrates, Galen, and other masters in the profession, as to following the indications in the treatment of malady and being guided by them, they would have trusted in the curative powers of Nature more, and the virtues of drugs and depletion less.

Commentators on the practice of medicine of this period complained of the want of *thinking* on the part of physicians. This was nothing new. Hippocrates did the same. There was no lack of observations, but the inferences drawn from them and connoted were often incorrect and misleading. To illustrate this phase of the medical mind, the distinguished author, Dr. Moore, relates a story (which may be taken, says Dungli-

son, as a prototype of many others) of a French medical student who lodged in the same house in London with a man with fever. This poor man was continually teased by the nurse to drink, though he nauseated at the insipid liquids that were presented to him. At last when she was more importunate than usual, he whispered in her ear: "For God's sake bring me a salt herring and I will drink as much as you please." "The woman," so says the narrator, "indulged him in his request; he devoured the herring and drank plentifully, underwent a copious perspiration and recovered. The French student inserted this aphorism in his Journal: 'A salt herring cures an Englishman in his fever.' On his return to France, he prescribed the same remedy to a patient in fever to whom he was called. The patient died, upon which the student inserted in his Journal the following caveat:—'N.B. Although a salt herring cures an Englishman, it kills a Frenchman.'"

Observation is a blind guide without the ability to draw correct conclusions. "No man can be content with mere perceptions," says Dr. Laycock, a medical celebrity of the period, "for these are the mere stimuli to thought." The distinguished author of "Researches on Phthisis," M. Louis, a man of great force of character who had many followers in the early century, fulminated at great length on the necessity of observation and classification, as a basis for reliable deductions. It is impossible, he said, to draw correct con-

clusions from a few analogous facts. One must have a good many of them, the more the better. But even so, it may be remarked, without the ability to discern, to think, and to know, they may mislead.

M. Louis was the founder of the Statistical School of Medicine, which at one time had many followers at home and abroad. Whatever merit this school possessed per se, it had a powerful influence upon the medical mind in arousing an interest in medical study and investigation which had waned after the labors and accomplishments of the brilliant men of the last century. But it had no effect to modify the reckless custom of dosing, so long in vogue. The curative power of nature, the *vis medicatrix*, seemed to have been ignored or forgotten in the heroic purpose to make powerful revulsive impressions on the system in cases of serious diseases, and in that way "to obviate the tendency to death." This appeared to be the chief object of the physician. In what then were known as bilious, or bilious remittent, cases were treated with twenty or thirty grains of calomel at a dose, to be followed with equally large doses of quinia, and opium, as required. Such was the antipathic method, or as Hahnemann characterized it, the allopathic practice. It had the effect desired, that of producing a contrary disease, or of setting up another and a different action in the organism from the natural one of the malady.

Nature did the rest when she could. We repeat, that the precepts of the masters, as to the power of Nature in disease, were no longer heeded. They were destined to arise and be proclaimed again, however, and to be heeded; and in place of the order to combat Nature, will be the injunction to study Nature and learn of her; trust her; follow her indications, and know that she alone has the perfection of wisdom.

The medical profession as a body would not admit any claims of cures by any agency but drug medicines. Psycho-therapeia, which forced its recognition on the profession at a later day, was then entitled to no respect; those that practised it merited their contempt. Perhaps they did, for they were an ignorant set of pretenders. Diseases that could be cured by such agencies were not diseases at all in the profession's view, but errors of the imagination. They failed to perceive that such afflictions were certainly the most serious of all maladies, and more difficult of relief; and it seems strange to us that their true pathological status should not have been discovered by the great physicians of that time; and yet it was not strange, because mental physiology had as yet thrown no light on the sympathetic nervous system and its relation to the cerebro-spinal system of nerves. Pathology of these systems and their relations had necessarily to wait upon the unfolding of their physiology. More thorough knowledge of physiology, more particularly of brain

and mind, was the great need of medicine. Much advance had been made in these studies, as has been seen; but it was inspired more by the discovery of the horrible condition and neglect of the insane in public institutions, and the growth of humane sentiments, than to the progress of mental physiology and pathology. The general awakening on this subject, however, had the effect to stimulate investigation.

To the French, more than to any other people at this time, must be given the credit of rising to the occasion in the profession of medicine, and to no man more fitted to meet it than to Marie François Xavier Bichat. That celebrity was born at Thoirette, Jura, in 1771, and died about thirty years later. But little was known of his great contributions to the anatomy and physiology of the nervous system until after his death. No man in the annals of medical history, probably, did so much and achieved so great an eminence in so short a time. His genius rivalled that of Haller, or Boerhaave—not in versatility, perhaps, but in originality of research. The chief advantage for an education which he had was his tutorship under the eminent surgeon Desault, of Paris, who, recognizing Bichat's genius, adopted him as his son. He was then twenty years old. Four years later he had collected and edited the surgical works of his preceptor, and established a medical school of his own in which he lectured on anatomy, surgery, and physiology, to which he added original

Marie François Xavier Bichat.

From Lith. de Grégoire et Deneux, á Paris.

researches of his own of great importance. His four volumes of "Applied Anatomy, Physiology and Medicine," which were published in 1807, says his biographer, "established his reputation as a profound philosopher." Bichat died a year later, leaving unfinished his greatest work on "Descriptive Anatomy" in two volumes, which was finished by his learned pupils, Buisson and Roux, who added four more volumes. The celebrated Corvisart declared that "no one has done so much in so short a time." He was long held as an authority in the profession, and few ventured to dispute his generalizations and conclusions, down to within living memory, except such as denied the proposition of Theism. Bichat was a stanch Vitalist, and was the first to point out the different and distinctive vital properties of the different tissues of the body, showing that the grade of organization and life advanced together in the evolution of nature and the animal and human organism.

However that may be, Bichat's demonstrations gave a profound impetus to the study of physiology, both human and comparative, and laid the foundation for the achievements of others in the same department. But for him medicine would not, perhaps, have had a Carpenter or a Griesenger, a Dalton or a Foster, a Dunglison or a Paine, a Broussais or a Flourens—at least not until a later period. Bichat was not only a great genius, himself, but he fertilized the genius of other men,

or, perhaps we had better say, he created an environment favorable to the development of genius in other men.

The celebrated Flourens—Marie Jean Pierre—was a fitting successor of Bichat in the study of physiology, and contributed no little to its advancement. He was born at Béziers in 1794, and took his degree in Medicine at Paris in 1812—at the age of eighteen. Like his contemporary, Bichat, he was precocious. His most remarkable work, which gave him an immortality, was published in 1824, at the age of thirty. That work was entitled "Researches on the Properties and Functions of the Nervous System of Vertebrated Animals." He had previously published an excellent and original treatise on "Researches on Irritability and Sensibility," and had been admitted to the Academy of Sciences, Paris. Nevertheless, the name of Flourens will ever be associated with his unique experiment by which he proved, not only that brain was the organ or seat of consciousness, but that the cortex of the brain was the seat of conscious intellection. This he did by paring away the cerebrum, slice by slice, little by little, of a dove, the intelligence of the dove sinking little by little as he proceeded; and when he had entirely concluded the process conscious intelligence of the bird had entirely disappeared, nothing remaining but its instinctive life. The bird did not die at once, but it was *idiotic*. It recognized nothing; it did not know its own mate, nor its food when placed

before it—but would eat it when placed in its mouth. Similar experiments have been made by other investigators in mental physiology, all leading to the same conclusion, some of them even more important as to the demonstration of specialized brain functions, as we shall have occasion to observe in a later chapter.

The honors of membership in learned societies were accorded M. Flourens; the Academy of Science, Paris, elected him a member, as did other institutes and academies. His labors, however, were cut short by death, in 1850.[1]

Jean Cruveilhier, born in 1790, at Limoges, France, was one of the more celebrated anatomists of the early century and contemporary with the celebrated histologist and anatomist, Béclard. He wrote a treatise on that subject and succeeded to the Chair of Pathological Anatomy, Paris, founded and left vacant by the celebrated Dupuytren in 1835. His great work on "Pathological Anatomy" was well known to students of medicine in America in the middle period of this century, and used at that time as a text-book in its medical colleges. Cruveilhier was a man of strong convictions and great achievements. He was one of the great lights of which France had so many in the early nineteenth century.

In England the name and fame of Dr. James Cowles Prichard is conspicuous in his department of research. No Englishman of that period did

[1] *Vide Nouvelle Biographie Générale.*

more, probably, to advance the knowledge of man in health and disease than Prichard. He was born at Ross, Herefordshire, in 1785; was graduated from the University of Edinburgh in 1810; and entered at once upon the practice of medicine and the studies in which he distinguished himself. Three years later he published his first work on "Researches into the Physical History of Mankind,"—ultimately in five volumes—a work of great merit. It was widely appreciated in America as well as in Europe. This great work was followed by his treatise on "Diseases of the Nervous System," the first distinct work of the kind that had appeared in English. It seemed to advance the study of that department of medicine in no small degree. His last work was a treatise on "Insanity," a very important contribution to the knowledge of that subject. This was first published in 1834, an era of great activity in the study and investigation of the physiology and pathology of the brain and nervous system, and the phenomena of Insanity. Prichard died at London in 1848.[1]

From James Cowles Prichard, of London, it is but a step to Samuel George Morton, of Philadelphia—though the dates of their birth were widely apart. The latter was born a few years later, 1799. The men, though different, were of similar tastes and bent. Each took the degree of Doctor in Medicine, and each gave to the study

[1] Thomas's *Biographical Dictionary.*

and practice of medicine but a minimum of his time. Both were naturalists, but one investigated the subject in a general way, the other in a more specific and special form. Prichard would trace the different races to the same primeval stock or species; Morton found by his ethnological studies among the skulls of the different races of men, that if they belonged to the same species, their origin was ages apart, so wide were their anatomical differences. The views of Prichard were naturally received with more favor than those of Morton, not upon the evidence presented, but by reason of the former's coinciding more with the popular cosmogony, say rather, belief.

Morton was a born scientist, and approached every subject that fell under his eyes in the true Hippocratian spirit. It did not matter where they led so long as the facts supported the course of evidence and unveiled the truth. His chief reputation was acquired in his ethnological studies. These he pursued from nature with industry and enthusiasm. The angle of a face or a jaw was more to him than the shape of a tibia or a pelvis, because the characters of a race showed themselves more in the cranial development, including the face, than elsewhere. His biographer says that

the publication of his "Crania Americana," in 1839, and of the "Crania Egyptiaca," in 1844, were the results of studies dating back to 1830, and pursued during that long interval with the greatest zeal and enthusiasm. The one embodied a description of

one hundred and fifty skulls of the various barbarous tribes of American Indians, including their facial angle, their contours, the relative capacity of different portions of the cranium, and finally, and most important, their internal capacity in cubic inches, ascertained by accurate measurement.

The conclusions at which he arrived were as follows:

First, that the American race differs essentially from all others, not excepting the Mongolian; nor do the feeble analogies of language, and the more obvious ones in civil and religious institutions and the arts, denote anything beyond casual or colonial communications with the Asiatic nations; and even those analogies may perhaps be accounted for, as Humboldt has suggested, in the mere coincidence arising from similar wants and impulses in nations inhabiting similar latitudes.

Second, that the American nations, excepting the Polar tribe, are of one race and one species, but of two great families, which resemble each other in physical, but differ in intellectual, character.

Third, that the cranial remains discovered in the mounds from Peru to Wisconsin belong to the same race, and probably to the Toltecan family.

We cannot follow the learned author through the mazes of his studies, however interesting it would be. To him they were worth while, since they conducted him behind the veil to the Arcana of Mysteries where few would care to go. In Morton's anatomical works, he showed the same

degree of precision and philosophical analyses. Excellent works on anatomy had been written before he was born; but no work on that fascinating subject had appeared in any language that showed the skill of the artist and the descriptive powers of the teacher to such a conspicuous degree as Morton's "Illustrated System of Human Anatomy, Special, General, and Microscopic." The microscope, although long since discovered, had never before been utilized in histology to the extent that Morton used it. His biographer, with poetic license of facts, eloquently says:

His was an exhaustive science—not a point remained unoccupied. From head to foot, from the epidermis to the innermost medullary canal, patient and careful observers had traced every tissue. Every prominence upon a bone, every curve upon an artery, each sinuous winding of a nerve, and every swelling of a muscle, had been described and named. The mediæval worthies, who, at the revival of learning, had renewed and enlarged the teachings of Hippocrates, Avicenna, Aristotle, Galen and Celsus, those later workers, who, after the Harvian discovery, had again reconstructed and completed the labors of Vesalius and his followers, were the only true discoverers in descriptive anatomy.—No room seemed left to the modern student.—And yet [concludes the biographer] it was in this exhausted science—these ways of learning worn by the feet of all that countless multitude, who, from century to century, had sought an entrance to the medical profession—that

Morton struck out a new avenue to fame and gained the priceless name of Philosopher.[1]

Morton had visited Edinburgh at a time when the subjects of ethnology, craniology, and phrenology were agitating the mind of specialists in those studies, as the celebrated Blumenbach, Lawrence, Prichard, Gall, Spurzheim, the Combes, and others. He no doubt received from them the inspiration which subsequently directed his career. He returned to Philadelphia in 1824, and with renewed diligence resumed his work. His study was a sort of museum of skulls of almost every variety and species.

It is customary to regard anatomy as a dry study. Yet the poet Holmes, who was professor of anatomy at Harvard many years, found inspiration in it. The bones of the human anatomy bear the same relation to it that the rocks do to geography—they are the substratum of something which only a mind illuminated with poetic genius can approximately conceive. It should be observed also, that the minute study of the anatomy of the brain had barely been entered upon at that period,—1830.

Morton did not admit, nor did he deny, that the doctrines of Gall had made a profound impression upon him. He saw that Gall and his *confrères* were not self-seeking men, but learned and devoted students of mental physiology, desirous only to find the truth as to the constitution of the

[1] Gross, *American Medical Biography.*

brain and the *rationale* of its functions. Morton saw nothing unreasonable in the doctrines of Phrenology, but much that was reasonable and worthy of being seriously entertained. His biographer, whom we are following, writing for his subject, observes that "a calm, unprejudiced investigation will show us, even now (1850), that they are based on principles of undisputed correctness; that only in their application—in the absurd mapping out of the cerebrum into territories for the passions and intellect, which, like the States of our own national Government, have each a sovereign power—are they at fault.[1] The division of the head into general regions of intellect and animal life is one which forces itself upon the physiologist; and the writer might have added, that it is quite as absurd to find regions in the brain for the repository of sentiments and propensities or passions, a truth that forces itself upon the physiologist, as it did upon the student of ethnology with a power it is difficult, if not impossible, to ignore. No one with Morton's perception could fail to remark the significance of the cranium of the Indian, "with its low receding forehead, its short anterio-posterior diameter, its flattened occiput, prominent vertex, high cheek bones, and prominent and ponderous jaws, and compare it with that glorious Grecian form, immortalized

[1] Nevertheless, there is something like it in *Dr. Jekyll and Mr. Hyde;* the change from a murderer to a saint, as in St. Paul etc.

in the Apollo Belvedere," and the character which each type represents, and withhold his assent from the essential doctrines of Gall.

Dr. Morton died young—in 1851—hardly living long enough to complete his work, yet long enough to have advanced the science of medicine, and the sciences to which it is intimately related, as no previous American had done.[1]

[1] *Vide*, the interesting sketch of Dr. Morton in Gross's *American Medical Biographies*, written by his colleague and friend, long since dead, Dr. Sanford B. Hunt.

SIXTH: PERIOD OF THE NINETEENTH CENTURY

(*THIRD DECADE*)

CHAPTER XIII

Progress of Chemistry and Pharmacy

IN the last previous decade chemistry was left in the hands of Dalton and Sir Humphry Davy.

A contemporary of Dalton and Davy, Neil Arnott, though not a chemist, was a physician and a physicist of prominence. He was a Scotchman, born in 1788, and began the practice of medicine in the second decade of the nineteenth century, in London, and otherwise devoted himself to the study of physics in its relation to medicine. His work on the "Elements of Physics, or Natural Philosophy, General and Medical," published in the following decade, was one of great merit, and its success brought him into prominence in influential circles in London. The work was well received by the colleges and widely used as a text-book. Among his sanitary inventions were the water-bed, or floating mattress for the bed-ridden, and the Arnott stove. He was the recipient of many

medals at home and from abroad for his clever inventions for the sick, and was honored by a membership in the Royal Society.

Chemistry is a study which possesses such fascination for the student of physics that its development would be assured were there no other incentives to its study than the love of it. But apart from that, there is another which is a much stronger impetus; we mean the development of the arts and sciences apart from medical pharmacy, which is absolutely dependent upon it. The commercial interests with which it is identified involve great fortunes in many departments of industry. That alone would make its progress assured and permanent.

Chemistry and the basic forces of nature are closely related. Many prominent physicists, indeed, maintain that it is through the interactions of chemical affinity that life is generated. Haeckel takes that view.[1] This may be a debatable question; and yet it has been proved that certain organic substances, like urea, for example, may be produced in the laboratory. Be that as it may, it shows the closeness of the relation which subsists between organic chemistry and the activities of the human body.

Another contemporary of Dalton and Davy was a genius who contributed to the advancement of chemistry more than had any previous chemist and physicist. His name was Johan Jakob

[1] *Vide Beginnings of Life.*

Berzelius, a Swede, born in 1779, in East Gothland, near Linköping, Sweden. Berzelius graduated in medicine at the University of Upsal, in 1804. He at once devoted himself to chemistry, and was appointed Professor of Chemistry at Stockholm. His contributions on that subject were voluminous. Among his first writings was his work in two volumes upon "Animal Chemistry." No man had appeared at that time who possessed so great a genius as an analyst and chemical manipulator. His great work was a "System of Chemistry" ("Lärebok Kemiant") in three volumes. This work was published about 1820, and translated into all the modern languages.

Berzelius had the benefit of the discoveries and generalizations of Dalton and the genius of Davy, by which he profited. The atomic theory of Dalton was his working hypothesis; but it does not appear that he added anything material to its further elucidation. He added to the known chemical elements, selenium and thorium. It was in organic chemistry that his researches were the most important. He is accredited with the distinction of excelling all previous chemists in the accuracy and variety of his analytical manipulations. By the request of the Academy of Sciences of Stockholm, he made annual reports on the progress of physics, chemistry, and mineralogy, which at the close of his professional career (1848) comprised twenty-seven volumes. They were invaluable for the knowledge which they contained,

and the aid they afforded to his contemporaries and collaborators in the field of science and industry.

Rarely in the annals of science is a man to be found who was dominated with a more unselfish and enthusiastic love of his profession. He lived a bachelor until late in his life—or until his work was done. His death occurred in 1848, at the age of sixty-nine.

The King of Sweden conferred on Berzelius the title of Baron,—Freiherr—toward the close of his labors.[1]

A very fitting contemporary, though widely separated, of Berzelius, was the distinguished American, George B. Wood, who was born in the State of New Jersey, U. S., in 1797.

Dr. Wood was not, strictly speaking, a genius, such as, it must be admitted, was the celebrated Berzelius, who accomplished so much with so few advantages; but he was an all-round man, a physician and scientist. If genius he had, it was for work. He was not yet eighteen years old when he graduated from the Academical Department of the University of Pennsylvania, and became a pupil of Dr. Parish, an eminent practitioner at Philadelphia. When barely twenty he had taken the degree of Doctor in Medicine at the

[1] Thomas's *Biographical Dictionary*. For a fuller account of this remarkable man see Louvet's *Notice sur la vie et les travaux de J. J. Berzelius*, 1840 (L. de Lomanie), *Galerie des contemporains*.

University of Pennsylvania. His specialty was chemistry, and in 1822 he occupied the Chair of Chemistry, and later that of Materia Medica in the Philadelphia College of Pharmacy; and, later still, a like position in the University of his Alma Mater, which he filled most acceptably during a period of fifteen years. In 1850 he was transferred to the Chair of Theory and Practice of Medicine in the same institution. Subsequently, Dr. Wood endowed no less than five chairs or professorships in the University of Pennsylvania—Zoölogy, Comparative Anatomy, Botany, Medical Jurisprudence and Toxicology. These studies, in addition to the ordinary curriculum of the University show Dr. Wood's extraordinary scope of interest in medical science. About this time he published a two-volume "Treatise on the Practice of Medicine," which became a text-book in Europe and America. But the great achievement of his life was in pharmacy. He may of a truth be said to have been the father of modern pharmacy. In 1856 he published a treatise on "Therapeutics and Pharmacopœia," which was unanimously adopted by the National Convention of Physicians, assembled at Philadelphia for the purpose of deciding upon a national pharmacopœia. This work became the basis of the "United States Dispensatory," in use until within a recent period. Owing to the death of his coadjutor, Dr. Bache, the chief part of this last work was written by Dr. Wood's own hand. It is said to have had a sale

of one hundred and twenty thousand copies. In point of priority, however, in American pharmaceutical work, we have to mention Dr. James Thatcher, who was born at Barnstable, Mass., in 1754, and who distinguished himself as a physician and a surgeon in the Revolutionary War, and also as an author. Dr. Thatcher wrote a work on the "Practice of Physic," and a volume on "American Medical Biography," the latter being the first work ever published on that subject in America. That was in 1828. Dr. Stephen W. Williams, of Plymouth, Mass., followed with a volume on the same theme in 1845. Dr. Thatcher published "The New American Dispensatory," in 1810, which was highly esteemed, "and ran through four editions in eleven years." It was not planned on the broad, comprehensive scale of Dr. Wood's great work on that subject, but it was a highly creditable work for that time. It is rarely that one man has achieved so much in so many departments of science, as Dr. Wood. The great University of Edinburgh recognized the value of his contributions to the practice of medicine by adopting his work on that subject as a text-book. The whole Western world, including Europe, is indebted to Samuel G. Wood for many timely contributions to the art and science of Medicine.

Philadelphia at this period was the medical centre of America. She had a great university, second only to Harvard; and two medical colleges, the Jefferson and the Rush. Many eminent medi-

cal men were among the professors, and its graduates took rank among those of Edinburgh and Oxford. Some of them, indeed, left imperishable names on their scrolls, two of the most conspicuous of whom were Samuel G. Morton and Robley Dunglison.

An important adjuvant to the further progress of practical medicine was the need of a systematic method in the preparation of medicines. Heretofore the practitioner had been compelled, in a large degree, to prepare his own medicines. He was both physician and apothecary, with less knowledge of drugs than he had of disease, and still less knowledge of how to prepare them than he had of their virtues. Moreover, an abuse had grown rank among unlettered apothecaries and druggists the world over, of dispensing their preparations to the sick on purely empirical knowledge as to the effects of the drug, and no pretence of knowledge as to the nature of the disease for which they prescribed. Such a custom embarrassed the practitioner by lowering his dignity and curtailing his practice. With the object of doing away with this evil and of introducing greater certainty in the *ars medica*, a movement was started in New York City in 1829 to found a school of pharmacy.

The pharmacal idea was a step in advance in the evolution of Medicine. The movement was to aid the busy physician in his duties. It could not, in reason, be expected that the family physician,

with all his other cares and responsibilities, could be able to do chemical and microscopical laboratory work in diagnostics and therapeutics, so indispensable to an intelligent procedure, in connection with the demands of his cases. In the first place, he did not have the laboratory; in the second place, he did not have the time, even if he possessed the necessary training and education for such work. A division of his labor was, therefore, indispensable to any proper degree of certainty in the treatment of disease,—and that end the pharmacy, when fully equipped and functioned, was to fulfil.

The pharmacal project was led by Messrs. John D. Keese, Henry H. Schieffelin, and Constantine Adamson, in which all the prominent druggists of the city of New York joined. The movement was immediately successful. The institution was called the "College of Pharmacy of the City of New York." In 1831, the college was duly chartered. It had for its object, "the cultivating, improving, and making known a knowledge of Pharmacy, its collateral branches of science, and the best mode of preparing medicines and their compounds, and of giving instructions in the same by public lectures." The first president of the College of Pharmacy of the City of New York was the most prominent druggist of New York City, and one of the most public-spirited of its citizens, Mr. Constantine Adamson, who had a pharmacy of his own at No. 6 Bowery, near

East Broadway—then the "Fifth Avenue of New York." This gentleman was "an apothecary whose professional training," in the language of the eminent Professor Henry H. Rusby, Dean of the College in 1895, "was builded upon a broad and liberal education, and his kindly address and cultured conversation, combined with strength of character and great ability, made him one of the mainstays of our college." Strong and touching were the words of eulogy recorded in the college minutes on the first occasion, when his friend Mr. John Milhau, occupied the chair left vacant by his death.[1]

It is pleasant to record that the College of Pharmacy of the City of New York was founded upon high aims and broad principles, without a money-making scheme in it, and that it has consistently justified its professions.

The work of the College [to quote the words of its learned Dean again] is directed by a practical and conservative body of hundreds of men, fitted by long experience to subserve the best interests of Pharmacy and Medicine, and, as a corollary, of the public. . . . Upon no other point have the promoters of the New York College of Pharmacy been more consistent and persistent than in requiring that the practical training of their students should proceed coincidently with their theoretical instruction in the fundamental sciences. Two means have been

[1] *Sketch of the College of Pharmacy of the City of New York*, by Dean Henry H. Rusby, M.D., 1895.

applied for reaching this result: the one, the introduction into the course of laboratory practice, where correct methods of technique might be acquired; the other, the alternation of the college courses with so-called long vacations, which are in reality term of practical science as junior in pharmacies, where alone an acquaintance with the complex business and professional relations pertaining to the practice of pharmacy can be gained.[1]

As an instance of the unbiassed and judicial character of this body of men, in promoting the interests of its object, we cite its course of procedure when two rival Pharmacopœias, those of New York and Philadelphia, were submitted for its recognition. "Although one of these works was native to their own city, and they had all the claims of weal, pride, and self-interest to bias them, yet their sense of justice led to a declaration in favor of that work which had originated chiefly in Philadelphia, and whose latest edition to-day rules the profession of the United States." The choice referred to was the work of the learned Dr. Wood, a notice of whose labors in behalf of pharmacy appears in these pages. The New York College of Pharmacy, the first in character in the world, commenced with small beginnings, but has grown into stalwart proportions. In 1879 it was absorbed by the University of the State of New York. We give below a statement of its scope

[1] *Op. cit.*

and curriculum, embracing its first year and the year 1895.

1829	Physics and Chemistry	John Terry, M.D.
	Materia Medica	J. S. Rogers, M.D.
1895	Physics and Chemistry	Prof. Elliott
	Practical and Analyt. Chemistry	G. A. Ferguson, M.D.
	Pharmacy	Virgil Coblentz, Ph.D.
	Direct. Phar. Lab'y	Virgil Coblentz, Ph.D.
	Materia Medica	Henry H. Rusby, M.D.
	Botany	Henry H. Rusby, M.D.
	Practical Botany	Henry H. Rusby, M.D.
	Physiology	Henry H. Rusby, M.D.
	Pharmacognosy	Smith E. Jelliffe, M.D.
	Direct. Micro. Lab'y	Smith E. Jelliffe, M.D.
	Mathematics	G. A. Ferguson, Ph.D.

It is needless to say that the institution has more than fulfilled the expectation of its founders.

An English contemporary of Dr. Wood in the

field of pharmacy was the celebrated Jonathan Pereira, born in London, in 1804. Pereira's "Elements of Materia Medica and Therapeutics," which was published in 1839, was the most learned and comprehensive work on that subject that had ever appeared in English. It was a marvel of erudition and widely used as a text-book in the colleges. Pereira's work followed that of the learned Wood's work on pharmacy, the scope of which was different. Both works greatly advanced the knowledge of pharmacy and materia medica.

Pereira also wrote a treatise on "Food and Diet," which was published in 1842 and edited in America by the learned Prof. Charles A. Lee. The work was held as standard for many years. Pereira was appointed physician to the London Hospital in 1851 and died in 1853.

Dr. Wood had a forerunner in the department of pharmacy in Anthony Todd Thompson, an eminent Scotch physician who was born in Edinburgh in 1778. He studied medicine and chemistry under the celebrated Monroe and Black, and went to London in 1820, and began the practice of medicine; but his taste led him to chemistry and pharmacy, to which he devoted himself. In 1811, he published his first work, entitled the "London Dispensatory," the first work of the kind that had appeared in any language. This work had a large circulation, being published in all the modern languages. A few years later he published "Conspectus of the Pharmacopœias of

London, Edinburgh, and Dublin" (1816); he also published "Lectures on Botany," and "Elements of Materia Medica" (1832). In 1828 he was appointed to the Chair of Materia Medica in the London University, and later to its Chair of Medical Jurisprudence, which he held at his death (1849). Few men have contributed more to the progress of the practice of medicine.

Chemistry was still further advanced by a genius of equal brilliancy to that of Berzelius, namely, the justly celebrated Justus von Liebig, who was born at Darmstadt, Germany, in 1803. He still has the reputation of being one of the greatest chemists of the nineteenth century.

Liebig was a child of fortune. At the age of sixteen he entered the University of Bonn. Three years later he went to Paris, where he had the good fortune to make the acquaintance of the celebrated von Humboldt and the learned Guy Lussac. Young Liebig had first, however, attracted the notice of scientific men of Paris by reading a paper before the French Academy of Sciences on Fulminic Acid and the Fulminates, the true composition of which was unknown until his discovery. This circumstance brought him to the favorable notice of von Humboldt. Through the favor of Humboldt, the youth obtained the professorship of chemistry in the University of Giessen. At that time he was only twenty-one years of age. It is difficult to comprehend the secret of such rapid advancement; but it was

justified by the events which soon followed. He founded there "the first model laboratory in Germany," and made the University of Giessen the most celebrated in chemistry in Europe, or the world. Students from all quarters of Europe went to Giessen, attracted there by the fame of its laboratory and its professor of chemistry. The results of his researches were felt in every department of the science, but more especially in that of organic chemistry. In this department Liebig rivalled his predecessors and all his competitors. It was not only as an analyst that he excelled, but in the application of his discoveries to the industrial arts—especially agriculture. In this field of research mankind to-day are reaping the fruits of his genius. At the age of thirty-seven he published one of his most important works on "Organic Chemistry in its Application to Agriculture and Physiology" ("Die organische Chemie in ihrer Anwendung auf Agricultur und Physiologie"). Other works on his favorite subject followed. His work on "Animal Chemistry," or "Chemistry in its Application to Physiology and Pathology," was far-reaching in its influence upon the theory and practice of medicine. It greatly extended the scope of physiology and pathology in the treatment of diseases by extending the knowledge of morbific causation. It may be doubted if the learned chemist comprehended what the ultimate results of his researches and demonstrations upon medicine were to be. His

next work was on the "Chemistry of Food," a treatise which was long held as authority in the schools of medicine throughout the world. His last considerable publication was a "Dictionary of Chemistry" in five volumes.

In this last great work he had the assistance of the celebrated Wöhler. The learned Kopp was also one of his collaborators. In 1852 Liebig accepted the Chair of Chemistry in the University of Münich; previously, however, writing "Familiar Letters on Chemistry," with the view of popularizing some of the more practical elements of the subject. After the important discoveries and elaborate researches in the art and science of chemistry of Baron von Liebig, that science could no longer be regarded as in its preparatory stage of development, but as having been firmly established. Although it may not have been fully evolved, its principles were established beyond conjecture. Its further progress has been made, and will be made, in applying them to new processes and new lines of researches, both in the arts and chemistry of vegetable and animal life. The influence of Professor Liebig on chemistry was wide-spread and cumulative. His principal works on the subject have been published in many languages. The Professor of Chemistry in the Edinburgh University was the first to translate them into English and to adopt them as text-books.

That Professor Liebig should have been in error

as to the chemistry of fermentation was not unnatural at that time. The theory of oxygenation of organic infusions seemed plausible in the absence of a more conclusive explanation; and he held on to that theory with grim pertinacity against the germinal theory, until M. Pasteur made it absolutely untenable. To Liebig is conceded the honor of being the founder of organic chemistry. As a further reward for his great service to science and humanity, he was made a Baron! He died at Münich in 1873.[1]

The development of Chemistry was most marked and rapid, following the discoveries of Cavendish, Priestley, Davy, Lavoisier, and Berzelius. Until the discoveries of these celebrities, chemistry had no established data which entitled it to the rank of a science. It had been cultivated for centuries in a practical way in connection with the preparations of medicine, and by visionists in the hope of finding the elixir vitæ, or the means of transmuting the baser elements into gold; but it possessed no claims to be a science, and had no basis to be so regarded until the demonstrations of the illustrious Swede, disclosing the laws of proportion of atomic chemical combination. That disclosure gave the needed impetus to laboratory work which was felt throughout all the colleges of Christendom. Naturally, therefore, the Chair of Chemistry soon became one of the most important professorships in the medical schools and

[1] *Nouvelle Biographie Générale.*

universities. Its scope had been suddenly enlarged, so as to embrace the study of Toxicology, Pathology, and Etiology, as well as the normal processes of digestion, assimilation, hygiene, etc. Every college, however insignificant, had its Chair of Chemistry as a study attractive and interesting, if not one of practical utility. Its study, however, became so important in the arts and industries of civilized life, as to make it one of the most prominent and useful in the college curriculum. The services of the chemist were in requisition in all assay laboratories, pharmacies, distilling, smelting, and other metallurgical enterprises, which to-day are in magnitude beyond ordinary conceptions. There is not even a country drug-store but must have its chemist—or substitute.

The limitations of a work of this kind permit the notice of but few of the workers in this most fascinating department of science, and only such names as have been the most prominently identified with its progress. In this connection we have to mention the name of William Gregory. He was born at Edinburgh in 1803, and was one of a long line of distinguished scholars, discoverers, and scientists by that name. William Gregory was best known by his work on Chemistry (in two volumes) which was used as a text-book in many of the medical colleges. In this treatise the author made an effort to separate the inorganic from the organic elements. The latter he termed

"organogens." The classifications, however, proved of no practical importance, nor was it altogether correct. He occupied the Chair of Chemistry in the Edinburgh University, his *Alma Mater*, with great credit to himself and the advancement of science. Gregory died in 1858.[1]

Another name was prominent among distinguished chemists at this period—that of George Fownes, an Englishman, born in 1815. Fownes became Professor of Chemistry in the University College, London, and published in 1844 a manual on "Elementary Chemistry," which was well received and widely used as a text-book in the medical colleges of America. It might have been called a medical text-book of chemistry, so well was it adapted to the requirements of the medical student. It was a volume prepared with painstaking care, and showed evidence of the student and scholar everywhere. The older members of the profession, especially in Philadelphia and New York, will remember with affection Fownes's "Elements of Chemistry." It was printed in Philadelphia in 1855, a few years after its author's death, which occurred in 1849.

A man of far different character, but who achieved wide celebrity as a chemist, was Benjamin Silliman, who for many years was professor of that science at Yale University, and achieved great popularity as a teacher and lecturer, and who was regarded as an authority in

[1] *Lives of Eminent Scotchmen.*

mineralogy. Though not in chronological order, his work in chemistry was done in the decade of which we are writing. His operations in the mineralogical branch of chemistry, we fear, were not above criticism. However that may be, Silliman was born in Trumbull, Connecticut, in 1779. He had every opportunity for advancement in his education; entered Yale at the age of thirteen; graduated when he was seventeen, and in 1799 was appointed a tutor in that University. Preparatory studies for college were not so exacting then as now. In 1802, President Dwight offered Silliman the Chair of Chemistry in the College, which position he accepted and filled acceptably for the occasion, which was not over-exacting. Soon after this he made a chemical analysis of a famous meteorite which fell at Weston, Connecticut, in 1807. This added materially to his reputation as a chemist. In 1818 he founded what was popularly known as *Silliman's Journal*, a monthly journal devoted to science and art. This periodical he edited and published during twenty successive years. It was recognized in Europe as a contribution from America to science.

Professor Silliman was one of the most popular lecturers at Yale, and his laboratory and lecture hall were the most popular and attractive places of the University. His manners were said to have been easy and graceful, and his speech fluent and lucid. "He was one of the few men in the country who could hold the attention of a popular audience

with a lecture on science." He also wrote voluminously upon subjects personal to himself disconnected from science, works of travel at home and abroad, etc. He was a large figure at Yale, and commanded an audience wherever he went. Strange to say, his contributions to the advancement of chemistry consisted of a text-book on that subject; the fusion, by the blow-pipe invented by Professor Hare, of certain bodies heretofore regarded as infusible, and the demonstration of "the transfer of particles of carbon from one charcoal point to the other in the galvanic battery." Nevertheless, as a chemist his reputation was world-wide. Few men of science have achieved distinction so easily and with less labor than Professor Benjamin Silliman.[1]

A worthy contemporary of Silliman was Robert Hare, one of the more distinguished of American chemists. He was born at Philadelphia in 1781. Professor Hare was a man of genius, and a thorough devotee of science. He invented the compound blow-pipe, as has been observed, by which the burning of hydrogen by oxygen produced a degree of heat previously unknown, and which was capable of fusing elements which had heretofore resisted all attempts at fusion. For this achievement he was awarded the Count Rumford Medal by the American Academy at Boston. In 1818 he was appointed Professor of Chemistry in the

[1] *Vide* Fisher's *Life of Silliman;* Thomas's ***Biographical Dictionary.***

Medical Department of the University of Pennsylvania, which he occupied for nearly thirty years. He had previously invented a galvanic Calorimeter, capable of producing intense heat. He was a frequent contributor to the *American Journal of Science*, and wrote a work on "Chemical Apparatus and Manipulations." Professor Hare's laboratory manipulations for skill and accuracy were never excelled, not even by the illustrious Berzelius, and his contributions to medical and chemical research were unrivalled.

Professor Hare's reputation was no doubt somewhat dimmed by the interest which he took in the phenomena of spiritualism, which were occurring all over the country at the beginning of the latter half of the nineteenth century, and which engaged the attention of many eminent men, among others the eminent Judge Edmunds of New York. With the view of testing the phenomena scientifically, Professor Hare constructed an ingenious apparatus, the operation of which was concealed from the eyes of the medium. To his surprise, responses to queries were given with equal correctness, and even responses to thought queries. Despite the ingenuity of the Professor to foil the medium, or to catch her in tricks of legerdemain, he had to confess himself beaten. The conclusion to which he came, therefore, was that the phenomena witnessed and conducted by him were genuine *as claimed*. Had he omitted the concession—"as claimed," no scientific man

would have had grounds to criticise his findings; for while the phenomena were genuine, it did not logically follow that they were produced by persons in the disembodied state—as claimed.

Professor Hare followed these investigations with a work on the subject, entitled "Spiritualism Scientifically Demonstrated." In this work the author exhibited the leading characteristic of the man—his profound sincerity in the investigation of nature, his devotion to the truth as he saw it, and his courage of conviction. These are high traits in human nature of which the world stands in great need.

We have followed the development of Chemistry from Alchemy to its present grand proportions, and yet barely above the plane of Physics. It has a scope, however, broader and higher than the scientists of that period dared to conceive—or, at least, to express. In the interactions of chemical affinity are disclosed powers which ally matter to the imponderable. Under the influence of heat and light and electricity, it assumes a variety of forms visible and invisible, and is even transformed into all or any of those forces, and into Mind itself, there is reason to believe. Thus has the chemistry of plant and animal life, so ably set forth by Liebig's studies in physiological chemistry, disclosed the source of vital powers; of metabolism and katabolism; of muscular motion and nerve-function; and last, and more important than all, an explanation of the processes of thought and

feeling in the combustion, or oxidation, of brain-substance in the process of cerebration. If in the interactions of crude matter, electricity may be produced, we conceive nothing improbable in the assumption that thought may be evolved in the oxidation of the highest form of matter which is known to exist—in brain substance. The substance of brain and nerve, be it remembered, is the highest organization of matter of which anything is known. Surely there is nothing unreasonable in the hypothesis, that in its oxidation there should be evolved, not heat—not electricity—not light, but Mind and Emotion—*Feeling*—Psychoma (ψυχομα). There is nothing illogical in this deduction, when once we admit the hypothesis of the correlation of forces, showing the unity of caloric, electricity, light, etc., and demonstrating that light is the primal source of all of them. This is a proposition beyond controversy to-day. Even the illustrious Lavoisier, in 1793, had a glimpse of its verity. He declared: "Sans la lumière, la nature était sans vie; elle était morte et inanimée. Un Dieu bien faisant, en apportant la lumière, a repandre sur la surface de la terre l'organization, le sentiment, et la pensée."[1]

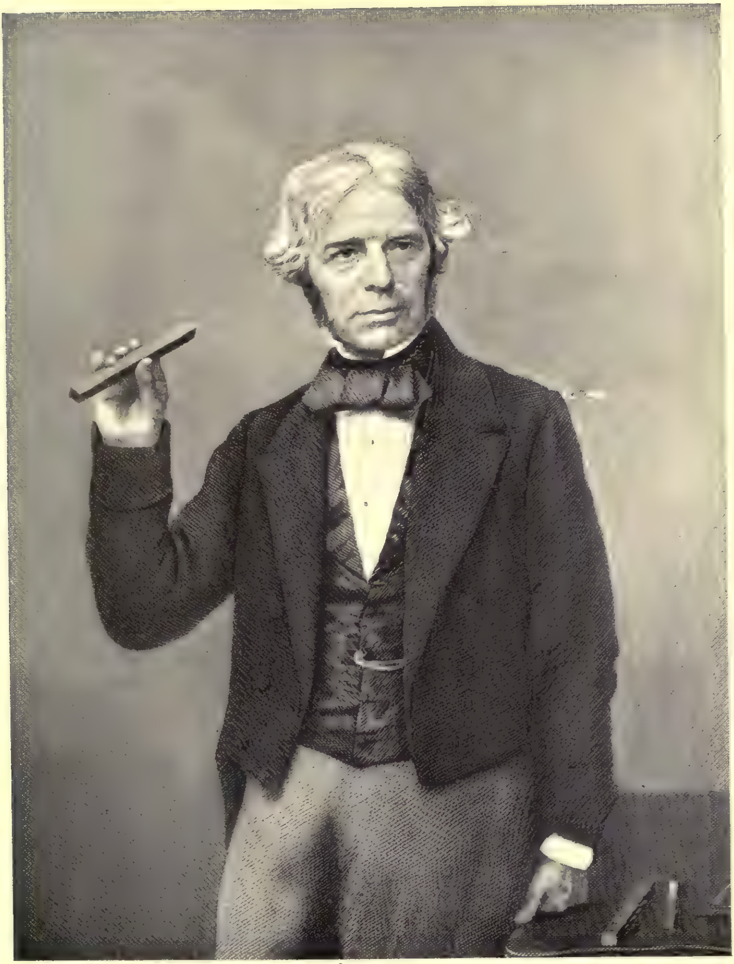
The studies of Prof. John William Draper, of the University of New York, as published in his

[1] Without light, nature was without life; it was dead, inanimate. A beneficent God, in diffusing light, spread upon the face of the earth organization, life, and mind.

"Chemistry of Light"; of Prof. E. L. Youmans, long Editor of *Popular Science Monthly*, of that city; of Sir David Brewster, in his "Treatise on Optics"; of Robert Hunt, of England, in his researches on light, and of the incomparable chemist and philosopher, Michael Faraday—all lead to this conclusion.

Michael Faraday

The career of Faraday is among the most remarkable in the annals of medical science. Although not a Doctor in Medicine, nor possessed of other titles, except such as learned societies conferred upon him unsought, yet his contributions to chemistry and to science generally were of such vast importance as to command in this place an appreciative notice of the man and his work. Michael Faraday was born at Newington, in 1791. His father was a blacksmith, but young Faraday was early apprenticed to the art of bookbinding. His education was naturally most meagre. Such leisure as came to him was spent in devising electrical apparatuses, which showed the bent of his mind. Having attended a few lectures on chemistry delivered by Sir Humphry Davy, young Faraday appealed to him for help, the result of which led to his being given a position in the laboratory of the Royal Institution. Here he made rapid progress in his electrical and magnetic discoveries. He may be said to be the founder



Michael Faraday.

From a recent photograph from life. Johnson & Fry, New York.

of the science of magneto-electricity. Faraday was not the first to conceive the hypothesis of the correlation of heat, light, and electricity; that distinction belongs to Dr. Mayer, in an essay entitled "Die organische Bewegung in ihrer zur Ammonlunge mit dem Stoffwechsel," in 1845; but Faraday was the first to demonstrate its truth. This demonstration led him to the amazing discovery of the influence of electricity upon light.

At the age of thirty-six Faraday received the appointment of Professor of Chemistry at the Royal Institution, where he continued to give lectures on that subject until his death, 1867. Though never having received a literary education, nor training in debate, rhetoric, or elocution, his lectures were models of grace and dignity, and clearness and elegance in expression. Of these lectures Professor de la Rive says:

> Nothing can give a notion of the charm which he gave to those improvised lectures, in which he knew how to combine animated and often eloquent language with a judgment and art in his experiments, which added to the clearness and elegance of his exposition. He exerted an actual fascination upon his auditors; and when, after having initiated them into the mysteries of science, he terminated his lecture, as he was in the habit of doing, of rising into regions far above matter, space, and time, the emotion which he experienced did not fail to communicate itself to those who listened to him, and their enthusiasm had no longer any bounds.

Scientific medicine is deeply indebted to Faraday, the unlettered, untutored scientist. Electrical science was developed by him. One of the principal currents—electro-magnetic—utilized in therapeutics bears his name. He enlarged the perspective of medicine, the sphere of its work, and its influence upon humanity. His illumination was not unlike that of other men who revered the truth and lived and labored close to the heart of Nature. The oneness which Faraday felt with her was a joy and a solace not to be found in the confession of any faith, or belief, nor in the utterances of any of the oracles, be they Hebrew, Christian, Buddhist, or Mohammedan. Happy was the circumstance by which this untutored son of Apollo escaped knighthood! Whom God stamps with His august impress needs no titles or other insignia to distinguish him from the multitude.

Although out of chronological order, we must give a brief account of a celebrated naturalist and physicist, before taking up the chemistry of light, namely Charles Bonnet, a celebrated Genevan, who was born in 1720 and died in 1793. He produced a work on the chemistry and physiology of plants in 1754, which awakened a wide interest among savants of Paris. He also published remarkable works on "Insect Life," "Organized Bodies," "Philosophical Palingenesis," etc., but his studies on the chemistry of plants are those which most interest us in this connection.

Bonnet was the first to show that the action of light on the vegetable kingdom was to decompose carbonic acid in the leaf of plants, disengaging the oxygen in that gas, and appropriating its carbon to itself. The celebrated physicist and heretic, Dr. Joseph Priestley, a few years later made the same discovery, but by a different process. He let a candle burn in a confined place until combustion ceased and the light was extinguished. He then introduced a fresh plant into the enclosure, and to his surprise, in the course of ten days, the air was again capable of supporting combustion; the candle would again burn in it. A few years later, a Dutchman, Dr. Ingenhousz, repeated, confirmed, and extended Dr. Priestley's experiment. He proved conclusively, as Priestley and Bonnet had done before him, that the function of plants and the process of combustion have a reciprocal relation; but far more than this: that the relation was powerfully influenced by light; so much so, in fact, that an effect which in a minimum of light it took days to accomplish, in a maximum of light was produced in as many hours. Acting on the suggestions afforded by these experiments, many observers have succeeded in throwing additional light on the chemistry of plants and the influence of light on organization in general. Lawson, Saussure, Boussingault, and others have each added important contributions to the knowledge of the subject. Thus, the last gentleman filled a glass vase with vine leaves, and placed it

in the sun. Then he passed a current of carbonic acid through it, which, on its passing out, was found, instead of carbonic acid, to be pure oxygen. By this means, immense quantities of oxygen may be produced in a short time.

Still later, or about the middle of the present century, MM. Cloëz and Gratiolet added new and important facts in confirmation of the induction. They demonstrated, to quote from M. Papillon's interesting paper on "Light and Life," the instantaneous energy of solar action on vegetable respiration. A few leaves of *potamogeton* or of *nayas* were placed in a gauge full of water, saturated with carbonic acid gas. Then the apparatus was exposed to the sun, when an infinite number of little bubbles of oxygen, almost pure, were seen to disengage themselves from the surface of the leaves. The shadow of a little cloud traversing the atmosphere was sufficient to check the process, which, however, resumed its activity after it had passed. Intercepting the solar rays by a screen was followed by alternations in the rapidity of the process of producing the gas bubbles, from quick to slow ascending or receding as the plant received or did not receive the sun's rays.[1]

It was also Bonnet who first remarked the influence of the sun in causing vegetables to grow vertically and tend toward itself whatever the position in which their seed may have been planted

[1] See M. Papillon's interesting essay referred to in *Revue des Deux Mondes*, tome lxxxviii.

in the earth. He proved, too, "that plants, in dark places, very generally turn towards the light."

The different principles of the solar ray do not influence the growth of plants in an equal manner nor in the same way. Those elements of the ray possessed of the highest degree of illuminating power are believed to be the principal agents of organization. The experiments in support of this conclusion are as simple as they are ingenious. Dauberry, has the honor of leading the researches in this direction. He commenced his investigations by growing plants under glasses of different colors and noting thus the precise results obtained under different colored light, for it is obvious that colored media absorb all light not their own color. He showed in this manner that the volume of oxygen disengaged by plants was less under the color rays than under the white rays. "The orange rays seemed to him the most energetic; the blue rays coming next in intensity."[1]

The labors of John W. Draper in a field of research allied to that of the celebrated Bonnet and Faraday, deserve more than a passing reference. Professor Draper was born in Liverpool, England, in 1811. He came to America in 1833 and entered the medical department of the University of Pennsylvania, where he graduated in medicine three years later. In 1839 he accepted the

[1] "Les rayons oranges lui semblaient les plus énergiques; ensuite venaient les rayons blues."—Papillon, *op. cit.*

Chair of Chemistry in the University of New York. The medical department of that institution was largely due to his influence.

In chemistry the discoveries of Professor Draper preceded many of those of Professor Faraday. His discoveries in the dynamics of light led the advance in the science of optics and anticipated the doctrine of the correlation of the physical forces; indeed, they comprehended the mutual convertibility of all the forces, physical and psychical, which Herbert Spencer extended to embrace the social forces as well. It must be accepted to be the highest conception in philosophy that the mind of man ever conceived. Professor Faraday declared it to comprehend "the highest law in physical science which our faculties permit us to perceive." And, as has been said, the law has been extended to embrace every form of force. The late Professor Thomas Youmans, himself the author of an excellent work on chemistry,[1] and for many years Editor of *Popular Science Monthly*, which was published by the Messrs. Appleton, asserted:

> The intellectual operations are directly correlated into physical activities. As in the inorganic world [he says] we know nothing of forces except as exhibited by matter, so in the higher intellectual realm we know nothing of mind-force except through its material changes in the nervous system; and it may now be regarded as a fundamental physiological principle

[1] *Elementary Chemistry.*

that no idea or feeling can arise, save as the result of some physical force expended in producing it.[1]

Later chemists and physiologists have accepted the same view. Professor Cooke of the University of California, in his fine "Elementary Treatise on Chemistry," reluctantly gives his adhesion to it. Dr. Brown-Séquard, a distinguished physiologist, discoursed with enthusiasm on the doctrine. In a remarkable lecture at the Lowell Institute, Boston, Mass., in 1874, he declared that the transformation of nervous into motor force "takes place every moment of our lives." He believed that light may be correlated directly into nervous force, although "it is not distinctly proven yet." There was, on the other hand, no doubt in his mind that nervous force may be correlated into light. And the learned Frenchman went on to say that "there are animals which are phosphorescent, and which are so under an act of their will, and, so far as we can judge, under the influence of their nervous system; that light also can be evolved as a transformation of nervous force." Continuing, the learned author declared that "there are cases of consumption in which light has come from the lungs. . . . The light appeared, not only at the head of the patient, but it may radiate from him into the room."

The chemistry and physiology of food are now

[1] Introduction to Professor Grove's *Correlation of Physical Forces.*

predicated upon this beautiful and sublime doctrine of the correlation and transmutation of force. Not only the amount of force derivable from certain kinds of food, involving their nutritive value, but also in determining the kind of food-values required by persons in different occupations.[1]

It has been observed that Herbert Spencer extended the operation of the law of conservation of energy to embrace the forces operating in society—the interactions of forces of people in the mass. In his learned "Treatise on Sociology," the great author says:

Now that the transformation and equivalence of forces are seen by men of science to hold not only throughout all organic actions; now that even mental changes are recognized as the correlatives of central changes, which also conform to this; and now that there must be admitted the corollary that all actions going on in a society are measured by certain antecedent energies which disappear in effecting them, while they themselves become active or potential energies from which subsequent actions arise, it is strange that there should not have arisen the consciousness that these highest phenomena are to be studied, not, of course, after the same physical methods, but in pursuance of the same principles.

Professor Draper's work on the "Chemistry

[1] *Vide* Professor Edward Smith's work on *Foods*, 1873; also Professor Crittenden's (of Yale University) exhaustless researches on *The Nutrition of Man*, 1906.

of Light," was in line of these later deductions. His contributions to historic literature were important and not inconsiderable; that on the "Intellectual Development of Europe" being the most important. He died in 1885.

In studying the phenomena of light, it is well to keep in mind its psychology. Radial energy is one thing, luminosity is another. The former comes from the sun in ether vibrations; the latter is a brain-product, psychic in its nature. In the absence of the thalamus optici, light as we know it—*i.e.* luminosity—would not exist. In fact, there could be no such thing as *light*. The universe would be absolute darkness, no matter how intense radial energy might be. The power to see, to interpret—perhaps "correlate" is a better term—ether vibrations, is purely of psychological origin and due to brain-function. The same observation is also true of sound or tone. Music is a product of the auditory ganglion. When this is wanting or deficient, the person is tone-deaf. He may have ears, but they do not hear. The great Frenchman, Comte, we believe, was the first to point this out in respect to the physiology of light.[1]

In a notable lecture in New York, in 1874, Richard Proctor, the English astronomer, and one of the foremost mathematicians of the nineteenth century, affirmed in the strongest language, the supremacy of the sun in vital phenomena.

[1] *Positive Philosophy*, pp. 232, 233.

> The sun is the source of all those forms of light and life which exist upon the earth [said he]. That is no idle dream, no fancy of the imagination. Every form of force upon the earth, every action that we perform, all the forms of forces that we know of, even the thoughts we think, may be said to come from the sun, through its influence in the evolution of matter in the organization of life upon the earth. It is by the sun's heat that life is maintained upon the earth.

At the same time the eloquent lecturer would not admit the primacy of germinal matter, without which there could be no life to be maintained.

With regard to this last proposition, Professor Thomas Henry Huxley, whose cast of mind forbade him to assume the subsistence of things hoped for, but not proved, in a notable "Inaugural Address before the British Association for the Advancement of Science," in 1870, said:

> If it were given to me to look beyond the abyss of geologically recorded time to the still more remote period, when the earth was passing through physical and chemical conditions, which it can no more see again than a man can recall his infancy, I should expect to be a witness of the evolution of living protoplasm from not-living matter. I should expect it to appear under forms of great simplicity, endowed like existing fungi with the power of determining the formation of new protoplasm from such matters as ammonium carbonates, oxalates, and tartrates, alkaline and earthy phosphates, and water, without the aid of light.

The learned professor's hypothesis may be well founded. Matter in a period so remote may not have assumed a condition in which light as we know it was needed. It is well known that some primitive organizations grow in the dark, and would be instantly destroyed by solar light.

SIXTH: PERIOD OF THE NINETEENTH CENTURY.

(*FOURTH DECADE*)

CHAPTER XIV

State of Theory and Practice

WE had occasion to observe, in writing of the closing of the last century, the impassive state into which the practice of medicine had fallen, and to point out the causes therefor. The chief cause of that condition at this decade remained, but was less operative by reason of the great advancement which the more important collateral branches of medicine had made during the last quarter of a century, such as Chemistry, Pharmacology, Morbid Anatomy, Physiology, and Hygiene, not to mention Surgery, the progress of which had been marvellous even before the discovery of Anæsthesis and Antisepsis.

The saying of Celsus haunts the mind of the medical historian who is at all sensitive to the ethical, namely, that no man is qualified to treat a disease of the nature of which he is ignorant. The practitioner had felt his way along down all the centuries at the bedside. He had been treat-

ing diseases the nature of which was not yet discovered, with remedies the virtues of which he was mostly ignorant, doing the best he could with eyes veiled from the light. Let no one cast reproach upon him for this state of things, for he had not had a fair opportunity. He had been heavily handicapped from the beginning, and shut out of the realm of investigation which it was most essential that he should enter, in order to find clues to what was needed—clues to morbific causation. We have had occasion to refer to this state of "Theory and Practice" before. It still existed.

All the years of this century down to this time, the fourth decade, had been memorable for its great men in every department of science; men of inventive genius, men animated with a supreme love of science, who devoted themselves to its study unremittingly, to the exclusion of social duties, the claims of family, or the obligations of friendship, or of their own health and personal well-being. The illustrious Pasteur was so absorbed in some experiment in molecular chemistry that he forgot his wedding day and hour and had to be reminded of them. It will have been observed that the more brilliant of these great men barely reached maturity, having done their work before, or soon after, the age of forty, shortly after which many closed their careers.

Returning to the subject of practical medicine in the first decade of this century, at which we left it, we have to mention the name of one of the great

pioneers of medicine in America, John Wakefield Francis, who was born in New York in 1789, graduated from Columbia College in 1808, and from the College of Physicians and Surgeons in 1811; at the same time joining Dr. Hoosick in editing the *American Medical and Philosophical Register*. In 1814, on his return from a tour in Europe, he was made Professor of the Institutes of Medicine in Columbia College, and in 1817 obtained the Chair of Medical Jurisprudence in the same institution. In 1826, he joined with Dr. Hoosick and others in establishing Rutgers Medical College, New Jersey, in which he occupied the Chairs of Obstetrics and Medical Jurisprudence. Previously, however, Dr. Francis had published many cases of morbid anatomy, and edited Denman's "Practice of Midwifery," and was associate editor, meantime, of the *New York Medical and Physical Journal*. He was one of the founders of the New York Academy of Medicine, of which he was chosen President in 1847.

Dr. Francis obtained great eminence in the profession at home and abroad, not only for his scholarship and character as a man and teacher, but as well for his influence in the advancement of medical science. His labors marked the beginning of New York City as the centre of American Medicine, and the decline of that which Philadelphia had honorably won and creditably held so long.

The distinguished American editor of John

Mason Good's great work, "The Study of Medicine," dedicated that work to Dr. Francis in the following words:

To John W. Francis, M.D.,

Late Professor of Materia Medica, Institutes of Medicine, Jurisprudence, Obstetrics, and Diseases of Women and Children in the University of the State of New York; Member of the Medical Society of London; of the Werneian Natural History Society of Edinburgh; of the Academy of Natural Science of Philadelphia; of the Lyceum of Natural History of New York; of the Historical Society of Massachusetts and New York; of the Literary and Philosophical Society of New York, etc., the sixth American edition of Good's "Study of Medicine" is dedicated by his obliged friend, A. Sidney Doane, New York, August, 1835.

Among the more distinguished contemporaries in New York of Dr. Francis were Drs. Delafield, St. John Roosa, Doane, Parker, Mott, Sims, Thomas, Emmet, Gray, Lee, and others of equal note.

Few men have done more to extend and broaden the practice of medicine in the New World than John Wakefield Francis, nor died holding a greater degree of the profession's respect. His death occurred in 1861, at the age of seventy-two.[1]

A name more conspicuous, perhaps, than Francis, appeared on the other side of the Atlantic, during this period, namely that of Karl Rokitan-

[1] *Vide Cyclopedia of American Biography*, vol. ii.

sky, who was born at Königgrätz, Bohemia, in 1804. Rokitansky was a man of great ability, and immortalized himself by his great work on "Pathological Anatomy," in five volumes, which was published in 1842, when he was thirty-eight years of age. He became Professor of Pathological Anatomy at Vienna in 1844, and subsequently a member of the Academy of Science of that city, and Rector of its great University. He was the founder of the Vienna Hospital, the fame of which is world-wide. Rokitansky's original researches in morbid anatomy made the labors of the celebrated Virchow easier, and of which the latter were a fitting sequel. Without a Rokitansky the fame of the author of "Cell Pathology" might have been indefinitely deferred.[1]

Claud Bernard, born in Saint Julian, at Rhone, in 1813, took high rank among physiologists of the fifth decade of this century. His researches added materially to the knowledge of digestion, especially of the function of the pancreas. He succeeded the celebrated Magendie as Professor of Experimental Physiology in the College of France in 1855. His experiments were conducted upon living animals, some of the more important of which, especially pertaining to the hepatic function, could not otherwise have been fruitful, the discovery of glycosure, for example. The same may be said also of his "Researches on the

[1] *Vide* Thomas's *Biographical Dictionary.*

Function of the Spinal Nerve," "Animal Heat," etc. Bernard died in 1877.

Bernard was a bold, indefatigable student of physiology, and he continued to be quoted by writers on physiology for more than half a century. His method of discovering the effects of different foods on the liver were wholly original and demonstrative. The animals that fell victims to his curiosity were chiefly rats and dogs, monkeys and cats. A long fast deprived these animals of sugar of glucose in the liver; flesh food immediately replaced it—hence the deduction of the glycogenic function of the liver.[1]

In this brilliant era of science in France, François Joseph Victor Broussais achieved a high place. Born at Saint-Malo in 1772 in poverty and without friends of influence, he yet attained distinction in medicine as a teacher and author in an age distinguished for eminent men in medicine and philosophy. Broussais was a man of profound orginality. He was advanced to the Chair of Pathology in the Faculty of Paris; and wrote a work on "Irritation and Insanity"; "A Treatise on the Theory of Medicine"; and may be said to be the founder of the Physiological School of Medicine, which had many followers in America in the early century. Nor has his influence lapsed altogether to-day. M. Broussais's career affords a striking example of self-denial and

[1] *Vide* Dalton's *Physiology*, p. 233.

indefatigable industry and what they may accomplish. He died in 1838.[1]

A physician less learned and brilliant than M. Broussais, but a man possessed of the true spirit of science, came into prominence in this decade with demonstrations in respect of the function of digestion. We refer to Dr. William Beaumont, who was born in the obscure country town of Lebanon, Connecticut, in 1785, and distinguished himself by his experiments and observations on the celebrated Alexis St. Martin, who recovered from a serious wound of the stomach, leaving a wide aperture, exposing the process of digestion. Dr. Beaumont was not slow to avail himself of the opportunity thus presented to study the process of digestion, for which purpose he kept the subject under his care for several years, at his own expense for the most part, and in 1833 published the results of his observations. These contained the first reliable and authoritative information that the profession possessed of the physiology of digestion, and naturally produced a profound sensation throughout the civilized world. Dr. Beaumont's work was published in England and on the Continent. He died in 1853, and the subject of his experiment in 1880, at the age of eighty-three.[2]

It would scarcely be consistent with the pre-

[1] *Nouvelle Biographie Générale.*

[2] Thomas's *Pronouncing Biographical Dictionary.*

tensions of a history of medicine to omit reference to the contribution to the practice of medicine of the eminent Marie Emmanuel Edouard Louis, de Saint Armour, who was a member of that brilliant coterie of physicians that made Paris famous as a medical centre during the third and fourth decades of the nineteenth century. M. Louis was born at Aï in 1787, and, after many years drifting about, took finally to medicine, and graduated at Paris in 1813. From Paris he went to St. Petersburg, and began to practise. Thence he returned to Paris and became the assistant of the eminent Chomel of La Charité. There he remained seven years, which he devoted to study, taking voluminous notes and piling up volumes of facts from which to draw conclusions. This method, he afterwards maintained, was the only way to arrive at truth. Thus he became the author of the statistical or numerical method of medical observation. Much ridicule was heaped upon the man and the method in his day; but it had a great influence upon the advancement of practice in the New World as well as the Old. It exerted a powerful influence on research, and led to the abolition of much that was vague and uncertain in medicine, and the substitution of a greater degree of exactness and certainty. To M. Louis, the invalid, the earnest, painstaking tabulist of facts and figures, modern medicine is largely indebted for its return to the method of the Greek masters of the art—the Inductive Method.

M. Louis's chief contribution to medicine was "Observations sur la Difficulté du Diagnostic dans les Maladies des Vieillards," which he dedicated, with filial piety—

"À mon père et ma mère."[1]

Robley Dunglison

We have now to write of one who is conspicuous in medical annals in America, and whose rare scholarship and elegant and lucid diction did more to enhance the dignity of the profession in this century than any man before his day. We refer to Robley Dunglison, who was born at Keswick, England, in 1798. His preparatory studies were begun in London. From London he went to Edinburgh and took a course in its great University; thence to Paris, where he took a course of lectures in l'École de la Médecine, thence to the University of Erlangen, where he graduated in medicine in 1824. It will be seen, therefore, that young Dunglison was well prepared to enter upon the career which subsequently distinguished him.

About this time the University of Virginia was established, and its directors were fortunate enough to secure the services of Dr. Dunglison. He occupied the Chair of Medicine, Anatomy, and Physiology in that institution. In 1834 he accepted a call from the University of Maryland, as Professor of Materia Medica and Therapeutics.

[1] *Nouvelle Biographie Générale.*

Robley Dunglison.

Courtesy of Messrs. Lea & Fibiger.

In 1836 he was appointed Professor of the Institutes of Medicine in the Jefferson College, Philadelphia. This position was created for him.

"Dr. Dunglison continued to perform the duties of this position with the highest credit to himself and to the institution until within a year of his death. It was owing," says the learned Dr. Thomas, in his mammoth "Dictionary of Biography," "in a measure to his talents, reputation, and personal influence, that the Jefferson College rose rapidly from the inferior position which it had held before his accession to its faculty, to the very first rank in the medical schools of America."

It was not only as a physician and teacher that Dr. Dunglison was distinguished. He was an eminent philologist, and few things, perhaps, delighted him more than the discovery of the root and derivation of an obscure word or term. Noah Webster was largely indebted to him for the origin and definition of technical terms, as the reader of his dictionary may have observed. The "Dictionary of Medicine," first published by Dunglison in 1833, was the most erudite work on that subject, we venture to say, that had been written. It is a marvel of accuracy and fulness of detail. Rarely will one look in its pages for a word relating to any branch of medicine in vain. He is almost certain to find it, and its origin and derivation. The ninth edition of the work appeared in 1852, and the author secured a copy of it, which has been one of his closest companions

in medical literature ever since. It comprises nearly a thousand pages, double column, brevier type. The author of the work was but thirty-five years old when it was first published. One wonders that he could have been equal to it at that age. It shows a marvellous industry on the part of its author.

Dunglison's "Human Physiology," in two volumes, the last and eighth edition of which was published in 1856, shows the same character in learning, thrift, and thoroughness. It is needless to say that nothing superior to it at that time had been published. He published a popular volume on "Human Health"; "New Remedies"; a work on "Therapeutics and Principles of Medical Practice"; "Practice of Medicine," in two volumes; "Therapeutics and Materia Medica," in two volumes, the sixth edition of which appeared in 1857.

These last volumes are, perhaps, the most valuable contributions from a practical point of view that this versatile author made to medicine. It contains one hundred and ninety-three illustrations of medicinal plants, domestic and foreign, briefly described, their medicinal virtues, diseases in which they have been used, mode of preparation, dosage, etc., information most valuable to the practitioner at that time, who in the country districts were—and still are in certain districts—under the necessity of gathering and preparing their own medicines. The author is very thorough,

precise, and accurate in the pages of this erudite work. The critic will rarely find mistakes or errors in its pages.

Besides the above procedures, the author gives his own classifications of remedies, according to their specific or special effects, as emetics, cathartics, narcotics, errhines, expectorants, anthelmintics, escharotics, rubefacients, etc., and those of the learned Pereira and Thompson, with whom he does not always agree; and also the botanical names of remedies, when an herb, with their genera, species, etc.

All of Dr. Dunglison's works were published by the celebrated publishers, Blanchard & Lee, Philadelphia, bound in sheep and of so excellent a quality that after more than fifty years' usage the covers show little sign of decay.[1]

During the period of Dunglison's career in Philadelphia, that city was the medical centre of America. For that distinction it had no competitor. Boston made a spasmodic attempt in the following decade to take the lead, a movement led by the poet and anatomist, Holmes, Bigelow, and other prominent gentlemen; but the views which they advocated, while they may have possessed much truth, were of too radical or academic a character for the times, and the movement failed. Philadelphia at this time was in her zenith. It had three Medical Colleges and hospitals all with faculties of learned and competent men, some of them

[1] Copies in the author's library.

distinguished, as Dunglison, Hosack, Physick, Beck, Morton, Wood, Meigs, Hare, Pancoast, Caldwell, etc., who were furnishing the profession medical literature of excellent quality, equal to all its demands. The distinguished Henry C. Lea was the leading publisher. But her ascendancy was destined to wane, or, if not to wane, to be eclipsed by New York. As a centre of medical publishing houses and distinguished medical authorship, however, she must long hold the lead.

Dr. Dunglison died at Philadelphia in 1869—not beloved as many physicians are, for he was too much of a student to cultivate friendships. Nevertheless, he was respected and honored by those who knew the rare qualities of his mind and heart and the rarer value of his achievements for the advancement of a profession which he loved. His volumes are pleasant to read even now when they have been superseded or are out of print, so learned are they and written in language flowing, clear, lucid, and elegant, and withal so concise and natural as to be absolutely free of a semblance of the pedantic or the ostentatious. The right word finds its right place and is weighted with its precise meaning. In this respect Dunglison has yet no rival in his own country though he has been in his grave nearly half a century.

The profession has had to learn over and over again that in the management of persons ill with disease, it is not always necessary to administer drugs; that oftener it is not. And we have the

truth declared, on the clear judicial statement of the learned and estimable Dunglison, writing at the period of his maturity, that

> the physician exhibits his skill better by controlling disease by appropriate regimen than by administering combinations of whose effects he often knows little, and where much of his practice must necessarily be involved in conjecture. . . . Any experiment may have one of two opposite results: It may *do good or harm;* and hence a practitioner is not justified in administering a powerful medicinal agent at random. If he be desirous of instituting experiments, he ought to take example from some modern therapeutical inquirers, and make them upon himself rather than upon his patients.[1]

It must be admitted that such wisdom from the pen of a physician whose training had been along the line of traditional medicine, indicates a marked advance over that of any previous era in the annals of medical history.

Contemporary with Dunglison in America, William Benjamin Carpenter in England was at work in the same field—in fact, each independently of the other. Carpenter, than whom no man became more distinguished in the first half of the nineteenth century, was born at London, in 1812. He studied medicine at the London University, thence he went to Edinburgh, as was the custom, to graduate at its famous University—in 1839.

[1] Dunglison's *Therapeutics and Materia Medica*, vol. i., p. 25, 1857.

Dr. Carpenter devoted himself almost exclusively to the study of physiology, comparative and human, and produced a voluminous treatise on each phase of physiology (1846–1874). For learning and original research they were unrivalled in their day. The author drew freely on the physiological writers of France and Germany, especially Roker, Torreneau, Pouchet, Baillarger, Guislain, Müller, Volkmann, and Kölliker, the last of whom distinguished himself by the aid of the microscope by making important discoveries in minute anatomy of the brain and nervous system, and contributed to the profession knowledge of great value as to the relations and functions of that system in man. Baillarger, his contemporary, though older, distinguished himself in the same branch of study. Baillarger possessed the scientific curiosity so characteristic of the French savant. The scope of Carpenter's physiologies, comparative and human, adds very much to their value. The known he sets forth with his customary elaboration; the unknown he indulges in theories and guesses upon, and finally leaves to others or future generations to solve. His works are simply masterful. Dr. Thomas declares that Carpenter's "Principles of Human Physiology" is a work scarcely equalled by any other. The same observation is equally true of his "Comparative Physiology." His latest and more important work, on "Mental Physiology," was published in America in 1874, and is a most important contribution to

Wm. B. Carpenter.

Photograph by Jerrard.

the knowledge of brain and mind. "Natural Psychology" would have been a title equally befitting the work, as the learned author treated the subject.

In this period we have to record in brief the services to medicine of Martin Paine, M.D., LL.D., who held for many years the Chairs of Institutes of Medicine and Materia Medica in the University of New York. Dr. Paine was born at Williamstown, Massachusetts, in 1794, began early the study of medicine, and graduated at Harvard in 1813, at the age of nineteen. Soon after this event he went to New York and devoted himself to practice. His bent, however, was controversial and philosophical, and the state of the sciences of medicine, particularly of "Theory and Practice," afforded a large field for the exercise of his polemical genius. His large octavo volume on "Physiological Commentaries" is a work of great erudition, and shows a wide acquaintance with the writings of English, French, and German authors. Their various schools of medicine, their theories and methods, the truths and fictions, facts and fallacies, fads and fancies, all pass under review, and are condemned or approved according to the point of view of the learned critic.

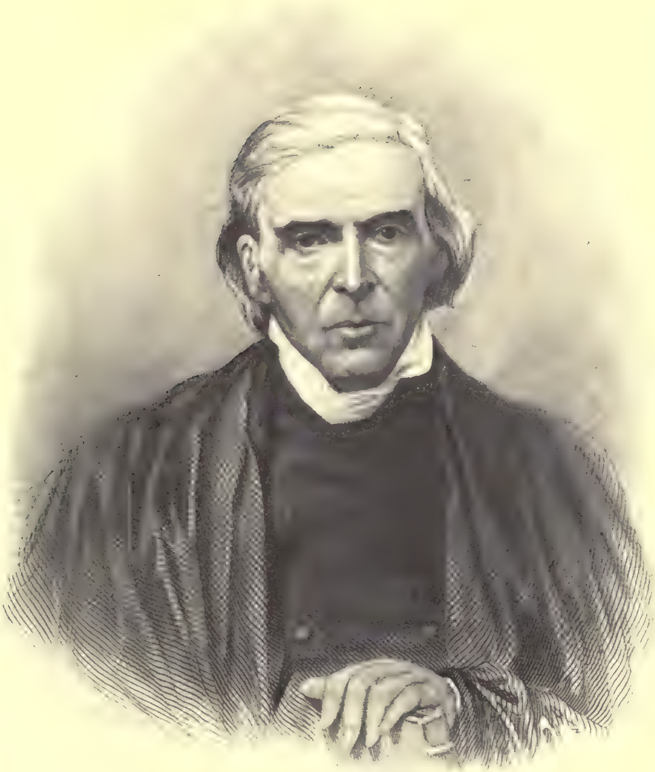
In much the same order is Dr. Paine's great work on medical institutes. That subject afforded him ample scope for the exercise of his learning and critical genius. He was a Hippocratian and expounded the principles of that sage and the learned

Galen, with derivations or deductions based upon them, with great profundity and logical consistency. If one accept his data, it would be impossible to escape his conclusions. And his data for the most part, accorded with the state of knowledge of that decade.

Professor Paine, with an adherence to the pathological views of his time, while not repudiating the *Humoralism* of Hippocrates, leaned more to *Solidism* as the foundation of pathology. But men as learned as he have committed similar inconsistencies. The object he had in view was to lay a sound substantial foundation on which to erect a philosophy of medicine that should endure. He opens his great work with the following paragraph:

Solidism and vitalism will form the basis of these Institutes. If consistent in all their parts, without a violation of facts, it is, *prima facie*, a proof of their foundation in Nature. To show this consistence, and to develop the great principles and laws of organic beings, and to erect a substantial fabric of Institutes which shall guide the hand of art, we must ascend progressively along the fundamental facts in physiology, pathology, and therapeutics; till at last we proceed to connect the great system to practical cases in the preservation of health, and a just, intelligible, and philosophical application of the materia medica to morbid states of the body.[1]

[1] The author had the privilege of attending Professor Paine's lectures. His manner of speaking was somewhat perfunctory and overdrawn—too much so to suit our critical and independent



Martin Paine.

No student of medicine, well grounded in the science and philosophy of the subject of medicine to-day need be an empiric, or an experimenter in the practice of his art. The principles of theory and practice, as old as the ages, founded upon observation of the masters in the profession, and confirmed by centuries of experience in practice, may be found in the masterly Institutes of Martin Paine.

Dr. Paine did not possess an impressive personality. His lectures were the enunciations of cold, unimpassioned logic and inspired no enthusiasm among his pupils. The attendance at his lectures was evidently perfunctory. The author has sat through the hour of his discourse with no flagging of interest in the lecturer or his theme, and at the end of it has witnessed a wild scattering of pupils, even before the last sentence was uttered. At the sound of the gong the benches would be empty, so hurried was the rush to get away. It was natural, therefore, that this learned, serious-minded, and conscientious professor of medicine should have had a small following. That he retained his Chair in the university so long was due to the great weight of his character, rather than to his popularity with his pupils. He was

judgment. His air was that of a man who held the whole field of science and discovery, and was able, therefore, to dogmatize. This was clearly a fault, for the medical world was on the eve of discoveries that were to revolutionize practice; and one could not help feeling that a man who knew so much, ought to be able to *feel* the possibility of infinitely more to know.

one of the original founders of the University of the State of New York.

Of his great work, the "Institutes of Medicine," which had no rival in the English language, the first edition was published in 1847; the last—fourth edition—in 1852, which indicates a large sale for a work of that kind. It was a painstaking production, in which it is clear to see from the brief preface to the work the author took a wholesome pride. It has a copious index, with cross references, forward and back, to sections in which the work is annotated, which omits the name of no writer whom the author quotes,—not even his own,—and no subject to which he refers. The volume is a large octavo, consisting of more than one thousand pages. Dr. Paine died in the seventies of the nineteenth century.

The name of Bright, one of the best known names, and the least known of distinguished men in medicine, deserves at least a passing notice. Richard Bright was born at Bristol, England, in 1789, and settled in London where he engaged in practice. How or where he obtained his education is not known. Evidently he was a modest, unassuming man, for the first the public or profession knew of him was by his work entitled "Researches into the Pathology of Diseases of the Kidney," a work of commanding importance to the profession. No more complex organ in the animal economy exists than the kidney; and Dr. Bright appears to have unfolded not only its

anatomy and physiology, but its pathology as well, and done the profession of medicine a service of lasting importance. He was the first to point out the nature of a kidney derangement of which such vast multitudes died, and to disclose the signs and symptoms of a chronic inflammatory disease of that organ to which his name is attached. It is an affection the insidious beginning of which is inflammatory, which, neglected, runs into degeneration and disintegration of the cortex of that organ. The influence of Dr. Bright's demonstrations was far reaching, for it led to chemical and microscopic analyses, not only of the urine in disease, but to the secretions and excretions of other organs. So intimate is kidney function to states of the physique, that a chemical and microscopic examination of the urine of a diseased person often discloses the nature of a malady, be it what it may. It was a little piece of ingenious work on the part of Richard Bright, but it gave him a wide celebrity. It was a valuable contribution to the practice of medicine.

No account of medicine in New York at this period would satisfy the just expectations of the reader without mentioning the labors of the Flints, father and son, both of whom distinguished themselves. The elder Austin Flint was born in Petersham, Massachusetts, in 1812, and graduated in medicine at Harvard in 1833. He possessed a strong bias for public medical work, and was seldom without a professorship in some institution.

He was one of the founders and professors of Buffalo Medical College; in 1861, he became Professor of the Principles and Practice of Medicine at Bellevue College Hospital, which had been recently organized, and of Pathology and Practice at the Long Island College of Medicine. His treatise on "Auscultation and Diseases of the Heart" (1859) took high rank, as did also his "Practice of Medicine" (1866).

Dr. Austin Flint, Jr., has won a distinguished position in medicine, likewise. His treatise on "Human Physiology" was probably unrivalled at the time it was published (1890). He was born at Northampton, Massachusetts, in 1836, studied at Harvard and graduated at Jefferson Medical College in 1857, soon after which he was appointed to the Chair of Physiology at the Buffalo Medical College, and later occupied a similar position in the Long Island Medical College, an institution founded in 1859. Some years later he accepted the Chair of Diseases of the Nervous System at Bellevue. He has acquired an excellent reputation as an alienist and neurologist in New York, and has received many marks of honor in Europe and America.

It could not be otherwise than that the practice of medicine should have been favorably influenced during the first half of the present century by the development of chemistry, pharmacology, and hygiene, and the enormous stride which the study of pathological anatomy and histology had made.

Disinfectants were just beginning to appear—at first in "Labarraque's Solution," and somewhat later, "Platt's Chlorides." Pharmacology had multiplied the agents of therapeia, and improved the method of their preparation. Chemistry and hygiene had extended the knowledge of food, and the general regimen of man in health as well as disease; the importance of light and ventilation in the sick-room; of sanitation and disinfection; of cleanliness and the freer use of water inside and out,—and of pure water,—which is a powerful adjunct in the care of the sick, all of which are of the first importance to the health of body and mind. In the theory of medicine there was no need of improvement; nor had there been since the writings of the Master. Physicians were taught by their Alma Mater that they were Nature's assistant in theory, if not always so in practice.

In regard to the medicaments in the leading or more prevalent maladies, the dosage, polypharmous prescriptions, etc., but little change was noticeable. It was largely a matter of judgment of the physician. The rule of "the more violent the disease the larger the dose," a vicious and mistaken proposition, was still in vogue. The mercurials were still favorites and administered in large doses as occasion seemed to require. Naturally, therefore, salivation might be often observed. Mercury, in blue mass, was still the sheet anchor in syphilis; though iodide of potassium was coming into vogue. Calomel still held the first

place in importance in typhoid, and what was then known as bilious and remittent fevers. Antimony tartarized, and wine of antimony still held their own in pneumonia and peripneumonia, although aconitum had been introduced for both those affections in the early stage. Bark had grown into favor for all the varieties of ague and fever, chiefly the alkaloid or the sulphate, and the basis, with iron, of the tonics. In the Southern and Western States of America the doses of this drug were enormous, all the way from fifteen grains to one drachm. In severe cases in the back districts the dose was not measured; it was taken by the teaspoonful, and without discrimination as to the time of taking it, its repetition, etc., the evils of which practice were commented upon by Sydenham. And when such a crude and reckless procedure failed to control the periodicity of the attacks, the recourse was to arsenite of potassa, or Fowler's solution, in five-, ten-, and fifteen-minim doses. Should this fail, an analogue was often found in cholagogue. This last was a popular remedy for ague in the Southern States, and is yet there and in the West Indies and South America. The freer use of opium in the form of morphia sulphate in all maladies of an acute or inflammatory form, was the custom. The custom had, indeed, become an abuse—no unusual trend or tendency of any good thing. It was generally given in the early stages of pneumonia and pleurisy in the form of Dover's powder, often, we feel

constrained to assert, with fatal results, in repressing cough and expectoration. Bleeding was still in favor—sometimes venesection, generally at the elbow, in other places by leeches and cupping. Rubefacients had not gone out of date. Blisters of cantharides, mustard pastes, stupes of turpentine, cantharidal collodion, setons, iodized lotions, glysters, draughts, poultices, etc., were still prized adjuncts of the physician's equipment and resources in all severe or critical and acute cases of malady.

The practice of the Master comprehended *elimination* in most diseases affecting the humors of the body. He recognized in that class of cases a *morbus* in the vital fluids, either ingenerated or imbibed from without, which necessitated purgation of some kind, from the blood itself, or from the bowels, or brain, by sternutatories, or all three. Hence the logic of the various recommendations for that purpose. The germ theory of most fevers confirms the wisdom of this procedure. It was venesection for foul blood, aperients for sluggish bowels, and sternutatories for the brain; the brain being supposed to be a gland at that time, and the source of humors, all those proceedings were a natural sequence. His early followers, however, frequently disregarded this injunction; his later followers of this period were equally remiss in that regard, or acted upon them out of place, or under conditions in which they did not apply. For example,

the "chalk-mixture" was commonly prescribed in cases of dysentery, when castor oil, an eliminant, or small doses of calomel or colocynth would have been more in accord with the practice of Hippocrates; opium and bismuth were usually prescribed for diarrhœa or cholera morbus, when some simpler carminative and the abstention of food would have been Hippocratian practice; epidemic cholera was treated with astringent mixtures in which opium was the leading ingredient, with the effect to restrain the effort of nature to eliminate a fatal microbic poison, and to increase the fatality of the disease. Simple demulcents, oft repeated, with small additions of brandy and water to restore the depleted serum of the blood and to keep up the waning strength of the patient, would have been, we believe, the regular practice of the "Father of Medicine"—which was always rational—that is, in accordance with the light that he had and the object to be attained; in the words, in accordance with the indications.

The practitioners who followed this practice and committed the errors referred to owed the profession no apology therefor. They did the best they could with the light which the state of medicine afforded. They had to grope their way in blindness of the specific nature of the *morbus* with which they had to contend. The science of specific causation, or pathogenetic matters in the humors, was not sufficiently developed to afford

them the aid they needed to meet the indications. Morbid anatomy had been cultivated, it is true, and had thrown a flood of light on pathognomonic conditions—their proximate causes, their signs and symptoms; but it had not uncovered and revealed the *nature of the specific cause or causes that lie concealed in the mystery of morbific activities.* It was too early in the nineteenth century for that achievement. But it was near at hand, awaiting the genius of a Pasteur and a Virchow.

Moreover, some years before this a few followers of Hahnemann had invaded New York and Philadelphia and had already made proselytes of several prominent physicians in each of those cities. The gross antagonism which naturally subsisted between the Hippocratian and the Hahnemannian could not be mollified or compromised. There was nothing to compromise on either side. One party charged the other with killing their patients; the other party were charged with allowing their patients to die and of being either knaves or fools. The rank and file of homœopathic physicians included many half-educated pretenders, who went on their rounds with a guide-book of practice in one hand, and a small case of infinitesimals in the other, to look after their patients. There was no law at that time against any one's practising medicine. The ignorant and the learned physician were on the same legal footing. One cannot wonder that the graduate in medicine looked with contempt upon the

unlettered homœopathic aspirant for honor and profit—the unlettered, be it observed, for there were many learned, high-minded physicians in that school of practice.

It was conceded in certain quarters, however, even at this date that homœopathy had modified the dosage of the dominant practice. Dr. Robley Dunglison was candid enough to make this concession.[1]

Homœopathy, however, was young in America. It was introduced in New York by Dr. Gram, a German, and Dr. Wilson, an Englishman, in 1833. It had, of course, been heard of before. Dr. John F. Gray and his brother-in-law, Dr. A. Gerald Hull, both prominent and reputable physicians, with a large and affluent clientèle, were the first to welcome these foreign gentlemen and to embrace the doctrines of Hahnemann. Homœopathy was fortunate to have made so auspicious an entrance to the New World. Soon after this came Lippe and Neidhardt, both Germans, and devoted, out-and-out Hahnemannians, to Philadelphia. They were soon followed by Hering and Hempel, the former a "high-dilutionist," the latter a "low-dilutionist," and both men of learning and ability. Dr. Wm. Channing, an excellent gentleman of Boston, also became an early convert to homœopathy and introduced it to that city about 1840. Through the influence of these

[1] *Ut supra.*

Rudolf Virchow.

gentlemen, large numbers of reputable and affluent families, not only of New York and Philadelphia, but also of Boston, made haste to accept the new system of medicine, which Dr. Oliver W. Holmes declared consisted chiefly of "a name and a nomenclature." It is needless to say that homœopathy did not spread with such amazing rapidity on its merits, for little was known of it by the profession, and nothing by the public, but rather for its newness, and the love of novelty and the mythical by the people. Perkinism spread from the same causes.

In Philadelphia sufficient interest was awakened in the subject of homœopathy to encourage the establishment, in 1848, of the Hahnemann Medical College. It opened with six students, but the number increased from year to year. In 1849, it graduated its first class, consisting of its first six matriculants; in 1866, it graduated a class of forty-five students.

The first attempt to teach homœopathy in this country was at Allentown, Pa., in 1835. The American Institute of Homœopathy was founded in 1844 by several prominent gentlemen of the homœopathic persuasion, of New York City. It soon had enrolled a large majority of homœopathic physicians of America and many honorary members from Europe. It met annually for the reading of papers and discussions and friendly intercourse. Its course has been criticised as being over-partisan and ultra-homœopathic; but it may

be credited with exerting a strong influence to maintain the organization of homœopathy and to keep its members in line, whether for good or ill must be left to the future to determine.

The warfare that subsisted between Homœopathy and the other schools of medicine was growing in bitterness every year. The Hippocratian of a bigoted trend would not consult with his small-dose brother, nor recognize him in any way. Nor is it strange that a sectarian in medicine should become a bigot in return. It was no unusual episode, in the following decades, for the homœopath to discipline—nay, stronger than that, to ostracize—his brother homœopath for indulging in deviations from the strict precepts of Hahnemann. Their societies occasionally investigated a fellow member so accused, and admonished him as to the penalties to which he was subject for such apostasies. One of their most distinguished members was expelled from the New York County Homœopathic Society for heretical teaching—he was always a heretic in practice; and for the same offence the same gentleman was in 1875 expelled from the American Institute of Homœopathy, the great body of which, though excellent gentlemen, were strong adherents of Simon-pure Hahnemannism. The attempt to discipline their superiors had the usual effect of such procedures, as in sects ecclesiastic—that is, to widen breaches, rather than to heal them. The Hippocratian societies wisely avoided such proceedings. We have no

knowledge in fact of their expelling from membership any reputable, thoroughly qualified, or diplomaëd physician for prescribing according to his judgment, be it small doses or large.

The medical gentleman referred to was Egbert Guernsey, M.D., LL.D., a Yale man of broad culture, generous public spirit, and liberal ideas, who was the first to drop the trade-mark, "Homœopathic," discard the high-potency sophistry of Hahnemann, and reject sectarianism in the medical schools. He had a large and influential clientèle, and was largely the means of establishing the New York Homœopathic Hospital, the Homœopathic Medical College, and of having, at the suggestion of the author, a Chair of the old-school Materia Medica created for it. But his offending was due, more than to any other cause, to the establishment, in conjunction with Messrs. Hills and Sumner, of a monthly medical journal entitled at first *The Medical Union.* The title of the publication, however, was soon changed to *The Homœopathic Times;* and, shortly after, to *The New York Medical Times*, a thorough-going liberal medical periodical in which no trace of bigotry or partisanship could be found. This was really the head and front of Guernsey's offending. It is but just to the societies and associations that had libelled *The New York Medical Times* and expelled its editor-in-chief from homœopathic societies for apostasy, however, to say that they subsequently apologized for their procedure and

reinstated Dr. Guernsey to fellowship. His associate, Dr. Alfred Kimbal Hills, promptly resigned his membership in the homœopathic medical societies, however, and connected himself with the regular school.

Guernsey and his learned associate, Hills, in *The New York Medical Times*, did a great work in soothing the asperities among physicians, cultivating a spirit of good will, and harmonizing the two systems of practice. *The New York Medical Times* was broad and liberal; far removed from sectarian bias. It did not profess to be homœopathic; it was devoted to the science and art of medicine, regardless of the 'pathies. The sectarian spirit was expunged from its pages. These gentlemen deserve high honor for their labors in behalf of medical union. Dr. Guernsey closed a career memorable for its usefulness in 1904.

Somewhat earlier than the period of which we are writing, there arose in the State of New York a medical sect known as Botanic physicians, or Thomsonians. This sect affiliated with the Eclectics. They prepared and prescribed their own drug medicines, which consisted of roots and herbs; the former dried and powdered, the latter made into infusions, tinctures, and extracts; these last were concentrated and made into pills, coated for convenience with lycopodium powder. Many reputable men, not graduates in medicine, obtained leave to practise this system in the inland towns and cities, and acquired a considerable

following. The founder of this school, for school it subsequently became, was one Thomson, and the sect was known as Thomsonian, from the name of its rather erratic founder.

Dr. Samuel Thomson was a man of genius in his way and quite original. Thomsonianism had quite a run in New England in the middle period of this century. Its author was born at Asted, N. H., in 1769. He began the practice of medicine in Boston, about 1800. He was a man of strong convictions and decided originality—by no means learned, but possessed of Yankee common-sense. He published a large book on "Practice," including the "Botanical Materia Medica," which was popular among the mothers of New England; a "New Guide to Health"; and a volume of "Life and Medical Science." This sect in medicine was ultimately absorbed by the Eclectic School, at Syracuse, N. Y. Dr. Thomson had a successful career from his point of view, and died in 1843, at the age of seventy-four.[1] He adopted the idea of Thales of the four primitive elements, earth, fire, air, and water. He discouraged the use of metals in medicine, because they were of the earth, earthy, with a downward trend. For a similar reason he recommended herbs, because they grew in the air, and possessed an upward trend. Moreover, he divided diseases and their remedies into two classes, namely, hot and cold. His maxim was, "heat is life and cold

[1] *American Biography*, etc.

is death." In cold stages of fever, therefore, he gave hot remedies, as a tea made of ginger and cayenne pepper, made palatable with sugar and milk. It was quite useful in colds. In the hot stage of inflammations and fevers, he prescribed cooling drinks, made agreeable with acids and sugar. If the case were pneumonia, or pleurisy, he added ipecac or lobelia, etc., in mild doses, as expectorants. Hot and cold wet compresses were employed according to conditions and circumstances. Anodynes were prohibited, especially in inflammations in the chest. Podophyllum root was their leading aperient in hepatic complications, etc. It was known as "Sick Indian." If the stomach were foul, the patient was put through a course of emesis with infusions of lobelia inflata. The experience was often a severe one and inflicted much suffering upon the victim.[1]

Dr. Thomson died in the middle century, and his school was merged into a regular medical college under the management of the Syracuse University.

A new school of medicine arose at this time in

[1] The author writes the above from personal experience and observation, having, when a young student, visited a case in the country with a "Botaniker" on one occasion, to whom a heroic dose of lobelia was administered. She (the patient) could not vomit, and for hours, long into the night, she lay as one cold in death from lobelia poisoning. The friends were in anguish, and the doctor could not conceal his anxiety. Finally, relief came with profuse vomiting. This was a procedure known as "taking an emetic," or having a "puke." It was a purge of the stomach *à la Hippocrate* with a vengeance!

Cincinnati, Ohio. Alva Curtis, the founder of the Physio-Medical College of Cincinnati, in 1856, was a man of excellent attainments. He was born in 1797, in New Hampshire, and received a good medical education, for that day and place. Being of a decidedly critical judgment, his genius and learning were devoted to tearing down rather than creating or building up. His "Medical Criticism" is a work worth reading; showing a wide acquaintance with medical writers. So also is his work on "Theory and Practice." His "Lectures on Midwifery," were delivered at the College which he established and of which he was president and its ruling spirit. Curtis died in 1881.[1]

Dr. Curtis was a man of character and literary ability, an interesting lecturer, and had an intelligent following. The movement which he instigated was inspired by the humane purpose of reforming the abuses that had grown up like rank weeds in medical practice. He was fond of quoting the declarations of some of the scholars in the profession, like the celebrated Hufeland of Berlin, and John Mason Good, Elliotson, Baillie, etc., of London, to the effect that "medicine had destroyed more lives than war, pestilence, and famine combined"; and that of Professor R. C. Gilman, of the College of Physicians and Surgeons, New York, that "a mild mercurial course and mildly cutting a man's throat were

[1] Personal recollections.

synonymous phrases." While these epigrammatic phrases were not intended to be taken literally, as a matter of course, they indicated the drift of public as well as professional opinion as to the propriety of the practice of heroic dosing which was more pronounced in the New World than in the Old.

The Physio-Medical system was an attempt to revive some of the forgotten principles of the ancient physicians, such as greater reliance upon Nature in disease, a more abstemious dietary, and of making use of medicines with a physiological bearing, rather than a pathogenetic, such as tonics, the acid wines, lighter preparations of Peruvian bark and iron, the salts of phosphorus, saline aperients, demulcent drinks in fevers, etc., a freer use of water of varying temperature; and especially a regimen adapted to the abnormal states of the organs of secretion and excretion. While these procedures did not cover the whole scope of the healing art, nor meet all the exigencies of disease and its sequelæ, they had an authority in the writings of Hippocrates, and were excellent in clinical results. The system of Physio-medicalism was broader and more rational than some of its congeners, but it was partial. In a civilized community, freed from epidemics and the liability to the germination of morbific causes, with sanitary households, pure water, and a pure, wholesome food supply, the system of Dr. Curtis would work admirably, and meet most of the demands which

the public required. But alas, civilization had not reached that happy state!

Small minds that have the art of tapping the wave of public sympathy in the progress of a movement religious, scientific, or philosophical, often achieve great ends. "Giant oaks from little acorns grow." The inventor of the sewing-machine known as Willcox & Gibbs, was a man of meagre education; and no one would credit the man with great abilities who revolutionized that industry by the invention of the hemmer. It was the blow of a blacksmith that produced the Revolution in England and took off the head of Charles I. A little candle destroyed the city of Chicago. The running down by a wagon of a peasant of Graefenberg led to the founding and spread of hydropathic establishments all over Europe and America; Mother Lee possessed ordinary ability, yet she led a world-wide movement in the religious world. The man that conceived the possible correlation of forces did not perceive its far-reaching influence upon science, physical and psychical. The inventor of the microscope died oblivious of what its momentous influence was to be upon biology and the science of morbific causation—etiology. Little inventors have revolutionized the industries of the world, such, for example, as the process of desiccating milk, making envelopes, paper boxes, etc. Their minds were *en rapport*, as it were, with the wireless system of thought-transference and

received unwittingly its magical impulses and messages.

These reflections were called to mind by the publication of a work, at this period, by Sir John Forbes, of London, entitled "Nature in Disease." The work was an excellent production of its kind, but by no means new nor remarkable; nor did it set forth views, nor deal with problems that had not been advanced or dealt with—perhaps not as well—before. But Sir John was a physician in the confidence of Queen Victoria, a man of character and standing, a graduate in medicine, a titled gentleman of distinction, which lent a degree of weight and significance to his works which otherwise they would not have possessed. He wrote, therefore, with authority of simple things he knew, of things that many others knew, and had fulminated against in Europe and America, with noteworthy results. He set forth in excellent rhetoric the crying need of reform in practice of the healing art, and dilated upon its abuses—and almost said that the quackery outside of the profession was due to the quackery inside of it; that nine-tenths of persons ill would get well without medicine and often in spite of medicine, and that the remaining tenth might need a little assistance from the doctor! He strongly advocated waiting upon Nature in disease in an attitude of expectation, and of practising a form of therapeutics since known as Suggestion, which was afterwards acted upon with such excellent success by

Egbert Guernsey.

Dr. Braid of Edinburgh, under the name of Hypnotism, which at a later day made a great stir in Paris and New York. His views were accepted by prominent medical men of Boston, professors in Harvard University, among them Professors Oliver W. Holmes and Jacob Bigelow. The latter wrote a clever little treatise on the subject entitled "Expectant Medicine." This movement had its day and its influence upon professional sentiment in promoting medical schisms—and lapsed, giving birth to other and similar schisms.

It is not at all strange to note that the views of Sir John Forbes were ill-received by the homœopathic fraternity, and well received, if not warmly welcomed, by that of the Hippocratian.

Dr. Forbes was born in Banffshire, Scotland, 1787, studied, and graduated in medicine at Edinburgh University in 1817. He was more a literary than a medical man, translating from the French Laennec's learned work on "Auscultation," editing the *British and Foreign Medical Review;* also, with others, the "Cyclopedia of Practical Medicine," a great work; and writing a "Manual of Select Biography," and other less notable publications, among which is his volume on "Nature in Disease," by which he will be longest remembered. Nature proved unavailing in his own case; he died in 1861, at the age of seventy-four, a greater than the average age of physicians at his time (68), but much under the age that the philosopher should attain (100).

SIXTH: PERIOD OF THE NINETEENTH CENTURY

(*FIFTH DECADE*)

CHAPTER XV

State of Surgery

THE beginning of the nineteenth century was so remarkable in science and discovery as almost to bewilder the chronicler of events, and to prevent him keeping pace with their procession. Such was the case in every branch of learning and industry; but the advance in the collateral sciences of medicine was, perhaps, the most conspicuous. Let no one suppose that surgery and surgical anatomy were in a state of quiescence because their consideration has been held in abeyance in these pages. It is for the convenience of our method of presenting subjects that surgery has been deferred, rather than for a lack of interest in the theme or a paucity of things to record. As has already been remarked, the time had not yet come for the art of surgery to demonstrate its possibilities. But it was near at hand. It needed only the means to relieve painful and

cruel sufferings incident to operations, and to discover or devise a method to protect wounds from infection, in order to develop its vast resources. Hampered as it had been through all the centuries for the want of these things, it had nevertheless made great strides since the Renaissance, in harmony with its sister branches of medicine.

Sir Charles Bell

Bell is a distinguished name in the annals of medicine, and that of Sir Charles is not the least so. Charles Bell was born at Edinburgh in 1774. He began the study of medicine under the care of his elder brother John, who had already risen to distinction as an anatomist and surgeon. Charles soon, however, rivalled his brother. He settled in London in 1804, and devoted himself exclusively to surgery. His first publication was entitled "The Anatomy of Expression," the illustrations being drawn with his own hand. This work was quite as original as Burton's "Anatomy of Melancholy," but showed more art. It had a wide circulation. That work was followed in 1806 by his "System of Operative Surgery," the most advanced work on surgery that had yet appeared. In 1821, Dr. Bell announced a discovery as to the double system of nerves issuing from the spinal cord, interior and exterior, the afferent and efferent, which, however, had been announced by Haller in the previous

century—but without actual demonstration. In 1824 his contributions to the knowledge of the nervous system were published; and he received the appointment of Senior Surgeon to the London College of Surgery in the same year. Besides the works on surgery which we have mentioned, he wrote numerous expositions of operative procedures in special surgery, such as Aneurism, Lithotomy, Trepanning, or modern Trephining, Hernia, Amputation, etc., and a treatise on the "Endowments of the Human Hand"; a most prolific theme, indeed, which later physiologists have not been slow to cultivate. Bell died in 1842.

Sir Charles's brother, John Bell, possessed not his brother's genius, but his contributions to surgery were important. He, too, was born in Edinburgh, in 1763, and in 1790 we find him delivering lectures on anatomy and surgery in that city, having built a theatre, himself, for the purpose. He acquired the reputation of being a skilful surgeon and a great anatomist. His great work on the latter subject, in four volumes, was published in 1804. Later, he published a work in two volumes on the "Nature and Cure of Wounds," and "Principles of Surgery," in two volumes. He possessed greater versatility than his brother Charles, and wrote upon themes other than surgery in a pleasing and entertaining manner. His descriptions of Italy were said to be among the most picturesque of that country that have ever been written. His

"Observations on Italy" were written when on a tour in that country in pursuit of health, which, however, he did not regain. He died at Rome in 1820.[1]

In the front rank of surgeons, of this decade, the equal certainly, if not superior to von Langenbeck, stands Baron Larrey, born in Haut-Pyrénées, in 1766. The development of surgery is largely influenced by war,—and the benefits which the great Napoleon conferred upon that art are naturally not inconsiderable. It was his custom to select the most promising young men in the army, and train them for surgeons, and to advance them in rank as they showed proficiency. Larrey was one of Napoleon's selections, and amply justified the former's wisdom.

Dominique Jean Larrey accompanied Napoleon in his expedition to Egypt in 1798, and published "Historical and Surgical Account of the Expedition to the East." To his genius the science owes the Ambulance, although the ant had forestalled him as the inventor of that contrivance for conveying the wounded. Larrey was Surgeon-in-chief of the French Army at Waterloo; was wounded and taken prisoner there. Returning to Paris, he became surgeon to the Royal Guards and of the Hôtel des Invalides. His contributions to surgery were the most important of any that had been previously contributed; for no man had had opportunities so vast in which to become

[1] *Vide* Chambers's *Dictionary of Eminent Scotchmen.*

master of the art. He wrote "Memoirs of Medicine and Military Surgery," 1812–1818, and a "Collection of Treatises on Surgery," (1821). Napoleon declared that he was the most virtuous man he had ever known. Larrey died in 1842.

Baron Larrey was not only a learned and skilful operator, and master of surgical resources, but he was a thinker as well. He was continually drawing deductions from the facts of his operative experiences. Among the more important of these were those in connection with brain pathology and mental science. He confirmed the induction of Gall as to the location of the amative instinct at, or near, the occipital protuberance, by observing that soldiers wounded there lost the sexual impulse, and that the testes became atrophied in consequence of it; likewise, that loss of the testes produced in course of time a flattening of the head at that point. He was also the first to point out that the cortex of the brain was the site of the psychic functions, and that lesions of the brain paralyzed the opposite side of the body to that affected by the lesion.[1]

Sir Benjamin Collins Brodie deserves a place among surgeons who have advanced and dignified the art. He had not the genius of his illustrious contemporary across the Channel, Larrey, but his achievements were many, and his contributions to medicine and surgery substantial. In some respects he was to English surgery what Larrey was

[1] *Nouvelle Biographie Générale.*

to that of France. Yet the men were unlike, made so probably by the difference of their environment and early training. Larrey's was on the field of carnage, away from schools and opportunities of personal culture. Brodie's opportunities were in schools and colleges, and under the tutelage of great physicians, anatomists, and surgeons, such as the incomparable Hunter and the operative genius of a Cooper. Each man was a representative and an embodiment of his day and generation. Each possessed a great personality.

The life and career of Brodie afford pleasant reading as written by himself, in his pleasant, versatile way. The limits of this sketch forbid us to linger upon them. Brodie was a studious, careful, painstaking student, at first devoted to anatomy and surgery, following with general medicine, and ending with psychological medicine. In surgery he was a careful, cautious, finished operator; as a practitioner, a judicious and discerning prescriber, alive to the interests of his patients, lest he do them harm by heroic dosing. He had a facile pen, and recorded his experiences and the lesson they seemed to teach. He cultivated no specialty; he was up to date in every department of medicine, and his opinions have been quoted with a certain degree of authority, or at least as worthy of consideration, down to our day. His chief work, "Diseases of the Joints," received more attention than that of Sir Astley Cooper on a similar theme. Brodie's career was

modestly successful. He began with earning £250 a year, and at the age of fifty-one his earnings were £11,000 per annum. They did not reach the height of Sir Astley Cooper's, for he did not possess the ambition of success, or pride of appearance and worldly glory that stamped the character of Sir Astley. Sir Benjamin was ambitious of personal culture; to know, and to be able to utter—to express himself felicitously, and to enter into the sublime mysteries of his art. These had greater attractions for him than the emoluments of his profession. It was otherwise with Sir Astley.

Brodie held many distinguished positions in hospitals and learned societies. He attended George IV. in his final illness, and won a baronetcy. In 1859 he was elected to the presidency of the Royal Society, a dignity never before conferred upon a surgeon. A year or two later he became blind, and in 1862 he died from the effects of a disease of his own specialty—sarcoma of the shoulder.

Dr. James Gregory Mumford, in his interesting and illuminating "Surgical Memoirs," referring to Sir Benjamin Brodie, well says:

Since men have sought truth through anatomy, physiology, chemistry, and allied studies, medicine has been rising gradually to a position of proper dignity; and to few men more than to Brodie do we English-speaking folk owe the debt of gratitude for demonstrating this fact. It was a fact which was

long seen, but dimly, by physicians themselves. It is not altogether known yet, save to the elect, but it has leavened the mass, and is percolating slowly through the crust of ignorance, of charlatanry, of self-deception; which so long have masked the real purpose of our art. It was this feeling for the truth—a feeling so familiar to us now as to be almost axiomatic, I presume—that inspired all of Brodie's work.[1]

There were many American surgeons of this period whose names will live long, but whom we must pass with a bare mention. J. Kearny Rogers, Surgeon of the New York Hospital, the first to trephine the skull for epilepsy, was born in 1793 and died in 1851; Hutchinson, of Long Island College Hospital (established in 1859), gained an excellent reputation; and Willard Parker, distinguished as a teacher of anatomy and surgery and as a skilful operator, belonged to this period. He was surgeon to Bellevue and New York Hospitals; the first to differentiate appendicitis and to advise operating for it. Parker was a graduate of Harvard College. He was born in 1800 and died in 1884. Among others, were James R. Wood, an eminent surgeon at Bellevue Hospital; Gurdon Buck, a contemporary of Parker and Wood, for a long time surgeon at the New York Hospital, and also one of the earliest operators for appendicitis. He excised the olecranon; invented an apparatus for the treatment

[1] Pp. 189–190. See *The Works of Sir Benjamin Brodie, Bart., D.C.L., F.R.C.S.*, London, 1865.

of thigh fractures, before the Paris-plaster splint came into vogue; and was altogether a skilful and resourceful surgeon and physician. A more eminent physician and surgeon was his Boston contemporary, Jacob Bigelow, born at Sudbury, Mass., in 1787; graduated at Harvard University in 1806, and became physician to the Massachusetts General Hospital, Boston. He is best known in the profession by his work on "Self-limited Diseases," and his last little book on "Nature in Disease," following the views advocated by Sir John Forbes, in his work on an allied subject. Professor Bigelow was a man of fine culture, of broad mind, and of liberal views—a thorough Bostonian, proud of being a resident of the "Hub" of the Universe (1850).

Oliver Wendell Holmes was one of the stars of Harvard, the brightest, perhaps, in the Boston firmament, at this time. He held, and filled, the Chair of Anatomy in that institution—and wrote poetry in prose and verse. His chief contribution to medicine was a word, "Anæsthesia," to characterize insensibility produced by ether and chloroform. Oliver Wendell Holmes needs no encomiums at our hand, at least for English readers.

It is difficult to pass over the life and services of the great surgeons of Germany at this period. There were Carl Ferdinand von Graefe, who was the first Professor of Surgery at the Berlin University, which was founded in 1808, with von

Humboldt at its head; Johann Friedrich Dieffenbach, a surgeon of equal skill, who followed him in that university, the first to use strabotomy in strabismus; Maximilian Joseph von Chilius, author of a "Handbook of Surgery," and Professor of Surgery at the University of Heidelberg; and more able and eminent still, Bernhard Rudolph Konrad von Langenbeck, who succeeded the learned Dieffenbach in the Chair of Surgery at Berlin in 1847. He was an ingenious operator, a brilliant teacher, a beloved preceptor, and a man of wide and commanding influence.

The distinguished Loeffler, of diphtheria-bacillus fame, was one of his pupils. Another distinguished pupil of Langenbeck was Theodore Billroth (1829–1894), Professor of Surgery at the Vienna University, since become so famous—made famous by the eminent character of its professors. Mumford, whom we have paraphrased in the above, calls him "a many-sided man," "almost the equal of Langenbeck," "interested in and concerned with every new thing;" "a daring and an original operator, and an inspiring teacher. He excised the larynx in 1873, and the stomach in 1881. Dozens of American surgeons, now active (1908), studied under him, and his name is a household word among us."[1] "His greatest contribution to surgery," says Mumford, "has been his pupils."

Dr. Philip Syng Physick, of whom mention has

[1] *Surgical Memoirs*, p. 100.

been made, was called the father of American surgery. But he made no distinct contribution to the profession, except his personal character and standing, which were of the highest, for which he was esteemed both at home and abroad. He died in 1837 at the age of seventy-three years.[1]

At this time there arose across the English Channel the greatest surgical genius of that day, Baron Guillaume Dupuytren, born at Pierre Buffièrre, France, in 1777. He was educated for the profession in Paris, and by virtue of his great talents and versatility soon rose to distinction. In 1808, the University of Paris gave him its Chair of Surgery, and in 1816 he was advanced to be chief surgeon in the famous Hôtel Dieu. His impressive personality, combined with his rare genius and scholarship, advanced him to the front of his profession. He performed a greater variety of operations than any previous surgeon; and when a surgical instrument of peculiar type or pattern was needed, he invented it. His resources in his art were almost without bounds. He never hesitated; was never in doubt; in every emergency he knew just what to do. Naturally, his pupils looked upon him as a god. It is said of him that on a certain occasion in a critical conjuncture he appealed to a German student near by to help him. "I speak only Latin," the student replied. "That will do," said Dupuytren, and at once addressed him in that language.

[1] *Am. Medical Biography*, Gross.

Dupuytren was not a popular teacher, yet he had a large following. His opinions were received as authority for many years by writers on medical subjects. He wrote no treatises, but his lectures at the university were carefully preserved and published in the medical journals of that day. Apart from the impetus he gave to the progress of surgery, he will be long remembered by his contributions to the knowledge of pathological anatomy. Dupuytren died in 1835 at the age of fifty-eight.[1]

To the same period of the younger Bell belongs the famous American surgeon, Valentine Mott, who was born on Long Island, New York, in 1785. Mott's father was a physician and the son took naturally to medicine, graduating in medicine at Columbia in 1806. After a course of study at Edinburgh, he returned to New York City and was given the Chair of Surgery at Columbia. Professor Mott was a man quite original in his way, and soon acquired a celebrity in his art. He was a bold and fearless operator. The author heard him say at one of his clinics on one occasion that a "physician who had not destroyed a hundred eyes could not be much of an oculist." He was the first to exsect the clavicle, and the first, also, to ligate the innominate artery. The carotid artery he had ligated more than forty times. The celebrated Sir Astley Cooper, the noted English surgeon, who was a contemporary of Mott,

[1] *Vide Nouvelle Biographie Générale.*

admitted that Dr. Mott had "performed more great operations than any living man." He wrote little of consequence to the profession; but his clinics were well attended at Columbia, and instructive, often amusing. He had a keen sense of the comical, and got a good deal of fun out of his patients at the clinics, as the author can attest, since he frequently attended them in 1857–8, when the distinguished surgeon was in his seventy-second and seventy-third year; but he was still hale and hearty. He held the Chair of Surgery and Anatomy at the College of Physicians and Surgeons, New York, at this time, which was established in 1807. Dr. Mott lived to be eighty, dying in 1865. "A man can be neither a philosopher nor a physician," says Herz, "by imitation or by rules, but by native genius alone." The observation is true of the physician, of course, but it is truer of the surgeon. Dr. Mott was a born surgeon.

The name of Samuel D. Gross deserves a prominent place among the surgeons of the early century in America. He was born at Easton, Pennsylvania, in 1805, and after many years became Professor of Surgery in the Jefferson Medical College, at Philadelphia. Gross was a man of modest habits and solid worth. While he did not acquire the celebrity as a surgeon that many physicians less talented than he acquired, still he was one of the great surgeons of the middle century, and did more than almost any man of his generation to promote the science to which he was

devoted. In 1839, he published his "Elements of Pathological Anatomy," in two volumes, which ran through three editions within a short time. It was the first work upon that subject ever written by an American physician, and well shows the character of the man in the clear and masterful manner in which the subject is treated. In 1859, was published his "System of Surgery," which took high rank among surgeons, and was for many years a text-book in the medical colleges.

Dr. Gross's achievements in medicine and surgery were appreciated at home and abroad. The alumni of Jefferson Medical College held him in the highest esteem. He was one of the founders of the "American Medical Association." That association, with the co-operation of the alumni of Jefferson, erected to his memory, soon after his death, at the City of Washington, a handsome statue which stands in front of the Army Medical Museum.

Dr. Gross's last conspicuous work was a publication of a large octavo volume on "American Medical Biography," editing the whole work and writing several of the biographies. The publication of this work was a duty which Dr. Gross thought he owed to the American profession, as no publication of the same scope and character had appeared since that of Dr. Thatcher, in 1845—too early in the century to do justice to the position and progress of medicine in America in 1860, the date of the appearance of Dr. Gross's work.

This work was far from being complete; the author and editor purposed to continue it, at least to publish another volume on the subject, but death intervened, in 1874, and prevented its fulfilment.

One of the most distinguished surgeons and physicians of France in the early period of the nineteenth century, was Pierre Augustin Béclard, who was born at Angers in 1785. He studied medicine in Paris, acquired an unusual mastery of anatomy and became Surgeon-in-chief of the Hospital de la Charité of that city, and later, Professor of Anatomy at l'École de la Médecine. This was in 1818, when Béclard was only thirty-three years of age. He was a fascinating teacher and most popular with his pupils, who well-nigh adored him. His "Elements of General Anatomy" met with wide appreciation. His influence on medicine was of the best and most promising for the future, but he died suddenly in his forty-first year, in 1825.

France was distinguished at this period by many noted surgeons, among the best known abroad being perhaps August Nélaton, who was born in Paris in 1807, and graduated in medicine at the age of twenty-nine, and at the same time became Professor of Surgery in the Faculty of Medicine, Paris.

August Nélaton was learned in his art and a man of consummate ability. His "Elements of Surgical Pathology," in five volumes, which were

published in 1861, was the greatest contribution to that subject that had yet appeared in any language. That production immortalized Nélaton.

But apart from Nélaton's contribution to the science of medicine, he was a skilful operator, and his services were always in requisition by both rich and poor. An amusing anecdote is related of Nélaton that on one occasion he amputated the leg of a patient, a man in opulent circumstances, and when the fellow asked for his fee, he replied, "Fifteen hundred francs" ($300). The patient remonstrated at the enormity of the fee, saying it was the work of only five minutes. "True," replied the surgeon, "but I could have taken an hour, had you preferred it." The fee was paid. This was before the days of anæsthesis, when time on the operating table was an element to be considered.

France was at this time, as we have said, distinguished for her surgeons, no less than for her physicians. The Napoleonic wars afforded them an excellent opportunity to develop their genius in the art. There were Jacques Lis Frank, the expert amputator (1790–1847); Alfred Armand Louis Marie Velpeau (1795–1867), surgeon to La Charité, a great surgeon and teacher, a thorough anatomist, and a most resourceful operator; Larrey and others who were second to no surgeon in Europe, although Germany's complement of surgeons was not far behind that of France; nor was England's. America, too, made

contribution of distinguished operators at this time, who had won fame at home and recognition abroad.

Alfred Armand Louis Marie Velpeau, mentioned above, was born at Indre-et-Loire, France, in 1795. He is deserving of more than a brief mention. Velpeau had no superior in surgery in his day. Like his contemporary, Broussais, he was a poor boy and attained great eminence by his own unaided genius. He became Professor of Clinical Surgery in the Faculty of Medicine, Paris, and Chief Surgeon to the hospital La Charité in 1838. Velpeau acquired a world-wide reputation. He wrote voluminously. His treatise on "Surgical Anatomy" was perhaps his greatest contribution to medicine. It was a text-book in the colleges in Europe and America within living memory. The mantle of the great Larrey seemed to have fallen upon him. He succeeded that great surgeon in the Institute of Paris, 1842, and died in 1867.[1]

Among America's distinguished anatomists and surgeons at this time, the name of William Edmunds Horner took high rank in London and Edinburgh. Seldom is it the privilege of the chronicler to record the qualities and deeds of a man possessed of a character more noble than that of Dr. Horner. Sincere in his friendships, straightforward in his relationships, honest and conscientious in his work and studies, Dr. Horner

[1] *Nouvelle Biographie Générale.*

won the love and esteem of his colleagues everywhere.

William Edmunds Horner was born in Virginia, in 1793. At the age of eighteen he commenced to study medicine in the office of Dr. John Spence, Dumfries, Virginia. A few years later found him in Philadelphia prosecuting his medical studies. For many years this young aspirant for work in the humane fields of the profession of medicine (the details of which, though interesting, would be out of place here), obtained the position of Demonstrator of Anatomy in the University of Pennsylvania, and later, Adjunct Professor of Anatomy under the learned and distinguished Physick. Subsequently, the Chair of Surgery was also occupied by him, both of which he filled with conspicuous ability. It was his good fortune to advance the knowledge of anatomy by discovering the *tensor tarsi* muscle of the eye, which heretofore had escaped the keenest observation of other anatomists. This was in 1824. Subsequently it was named for him *Musculus Hornerii*, in honor of the discoverer. His claim to this discovery is universally conceded. Later, Horner published his further contribution to medicine in a work entitled, "Spinal Anatomy and Histology," which became at once a text-book in many of the medical colleges in America, England, and Edinburgh.

Dr. Horner was a man of delicate physique, but an industrious, indefatigable worker, giving

himself six hours for sleep, the rest of the twenty-four to his work. He died in harness in 1853, at the age of sixty. Few men in Philadelphia had been so mourned at their death as was Dr. William Edmunds Horner.[1]

There are many physicians of eminence who have distinguished themselves in literature, rather than in medicine, who merit a notice in these pages. Among the first of these in America is Dr. Joseph Thomas, of Philadelphia, Penn. He was born in Cayuga County, N. Y., in 1811; educated at Yale University; and took the degree of Doctor in Medicine at the Medical College of Pennsylvania—dying in 1891.

The work to which the learned author devoted his life is entitled "Universal Pronouncing and Biographical Dictionary." This work, in one large octavo volume, of nearly 2400 double-column pages, was published by the Messrs. Lippincott & Co., in 1873. The work is a model of learning and painstaking industry and of great value to the scholar and historian. One will not often fail to find in its pages the name of any personage who was distinguished in any department of the world's activities—down to 1860. We do not hesitate to pronounce this work of Dr. Joseph Thomas the greatest of its class in the English language, at least, of any that has come under our notice.

[1] Gross's *American Medical Biography.*

The First Ovariotomist.

An American physician of different type, but of distinguished merit, from that of Dr. Horner was the celebrated Ephraim McDowell, who was a Virginian, born in Rockbridge Co., in 1771. He is out of chronological order in these pages, but his place seems to be more fitting here, especially since the work that entitles him to be considered at all was in this century.

McDowell's family removed to Kentucky when he was two years old; but a few years later the lad was sent back to his native place to school. His education was the most meagre. But he obtained a place in the office of Dr. Humphrey, at Staunton, Va., where he remained until prepared to enter the University of Edinburgh in 1793. It does not appear that McDowell graduated from Edinburgh; no diploma was ever discovered among his papers; besides, the University of Maryland conferred upon him the honorary degree of Doctor in Medicine, in 1825, which it would not have done were he already an M.D. Be that as it may, he returned to Kentucky in 1795, and began to practise at Danville, that State. And although in the wilds of Kentucky, McDowell was soon overrun with patients from far and near, both surgical and other. And now, after a few years of experience, comes the event which makes this brief account of the man of interest to the reader. For brevity's sake we

will paraphrase from his biography this rather prolix account of it.

Dr. McDowell had practised medicine and surgery for fourteen years, and had secured a reputation for the boldness of his exploits in surgery, when, in the autumn of 1809, he was consulted by a Mrs. Crawford, who was the subject of a large ovarian tumor. . . . After a most thorough and critical examination, Dr. McDowell informed her—that the only chance for her relief was excision of the diseased mass. He told her that he had never performed the operation, but that he was ready, if she were willing, to undertake it, and to risk his reputation upon the issue. . . . At the close of the interview she assured him that she was ready to submit to his decision. The result has been long before the profession. Mrs. Crawford submitted to the operation, and thus became the first subject of ovariotomy of whom we have any knowledge.[1]

Very naturally, the claim that was set forth by Dr. McDowell's friends, that he was the first in medical annals to perform ovariotomy, was disputed by the profession in England. Dr. Samuel D. Gross, McDowell's biographer, a man of most judicial spirit, decided the controversy in McDowell's favor. He writes:

Until I had carefully investigated this matter I was of the opinion, in common with others both in this country and in Europe, that a foreign surgeon, L'Aumonier, of Rouen, had anticipated our country-

[1] *American Medical Biography*, Gross.

man in this bold and daring undertaking. The attempt to remove this organ is said to have been made by that gentleman as early as 1776. Upon inquiry, however, I found that this was not the fact; that the case on which he operated was one merely of an abscess of the ovary consequent upon parturition. There was, of course, no need here for extirpation; all that was done by L'Aumonier was to puncture the abscess and give vent to its contents.[1]

Other claims to priority were made. Professors Dzondi and Galenzowski, whose claims precede Dr. McDowell's, were proved to be unfounded by the learned Dr. Washington Atler of Philadelphia. In a work published by Dr. Dzondi, at Halle, in 1816, entitled "Beiträge zur Vervollkommnung der Heilkunde" ("Contributions on the Improvement of the Healing Art"), is an account of a pelvic tumor in which a cure was effected by drawing out the cyst through an incision in the wall of the abdomen, allowing it to mortify or slough, and removing with a pair of broad forceps by piecemeal. It was not an ovarian cyst at all, nor was the subject of it a woman, but a boy!

There appeared to be some grounds for the case of Dr. Galenzowski being an ovariotomy, but the sac or cyst was pierced and drained, and the sac secured to the wound in the abdomen by stitches to prevent peritoneal effusion. Strange to say, the patient recovered! This operation,

[1] *Op. cit.*

however, was performed in 1827, eighteen years after that of McDowell.

Dr. McDowell's case of ovariotomy was treated with derision—nay, stronger than that, with contempt—by the European medical press, especially by the Editor of the London *Medico-Clinical Review*. No end of fun was made of the Kentucky backwoodsman performing an unheard-of operation! "A back settlement in America, Kentucky," writes the versatile editor in a subsequent issue of the same periodical, has beaten the mother country, nay, Europe itself, with all its boasted surgeons thereof, in the fearful and formidable operation of gastrotomy, with extraction of diseased ovaria," etc. It is but just to the Editor of the *Medico-Clinical Review*, however, to say that he subsequently retracted his statement and apologized for his rudeness.

Skepticism of the operation was rife at home. It was a long while before the facts of the case were admitted by the profession generally in America. This first case of ovariotomy was followed by others, and before his death, in 1830, Dr. McDowell had performed the operation five times. That any of them was successful was a matter of wonder in the state of knowledge of antisepsis at that time and the means and methods of its use.

Dr. McDowell was not a genius; nor was he a learned and scholarly man; he was rather a practical surgeon and physician, possessed of

shrewd common-sense. He blundered into fame by an achievement which he did not seek, and was a long time in finding it out.

Dr. McDowell gave an impulse to special surgery of which he did not dream, and never knew. He was really the father of Gynecology, a department of medicine which reached gigantic proportions at the end of the nineteenth century. To this subject we shall have occasion to return.

Among the conspicuous students of surgery in America, the name of Charles Aloysius Luzenberg should not be passed in silence. Dr. Luzenberg was born in the city of Vienna, in 1805. At the age of ten his father began to prepare him for a medical career. When, therefore, both father and son came to America, in 1809, the latter became the pupil of the celebrated Dr. Physick, of Philadelphia, and in 1825 matriculated at the Jeffersonian Medical College of that city. His bias was for surgery, and in that branch of the medical art his instructor gave him all the opportunity to become proficient that he required. He had a genius for operating and lost no opportunity of cultivating his skill.

When at the Charity Hospital in New Orleans, like many young enthusiasts in the profession, he imagined that he had made an important discovery in the treatment of small-pox. By excluding the light from the room during the eruptive and pustular stage of that disease, he found that his cases recovered with less pitting

of the face, and that deep pitting was usually avoided altogether. His discovery was heralded abroad in the medical journals, but to his chargin he found that MM. Dupuytren and Schmalkalken had preceded him many years in that procedure! It was new, however, to his preceptor and to his colleagues in America.

In 1832, young Luzenberg went to Europe on a tour of inspection and observation among the hospitals. "But it was chiefly at the unrivalled clinic of Dupuytren that he passed his time." The account which his biographer gives of his visitations at these clinics is interesting. Referring to the celebrated surgeon, M. Dupuytren, he says:

> Who has seen the Autocrat of the Hôtel Dieu in green coat and white apron, treading with measured steps at the head of his crowded class through the vast salles of his chirurgical empire, with his redoubtable looks and regal dignity, putting bluntly a question to each patient as he passes on, so pertinent as to draw forth as prompt a response, without being fascinated by the power and omnipotence of his strong mind? . . . For this exhibition of official pomp, however, Luzenberg cared less than for the wonderful acumen and diagnostic foresight, his oracular decision based upon scientific deduction, and the admirable forecast with which he modified general methods of practice according to particular individual cases, that he yielded to him the homage due to extraordinary merit.[1]

[1] *American Medical Biography.*

Dupuytren.

From a lithograph by G. E. Madeley, London, Eng.

After enjoying the association and companionship of some of the best surgeons of Europe for several months—of Herr Langenbeck of Göttingen, MM. Paraset, Rouana, Lisfrank, Dupuytren, Schmalkalken, and others—at the various hospitals and clinics of that great centre of art and science, Luzenberg returned to New Orleans and entered with renewed zest upon his work. Before the expiration of a year, he had built the Franklin Infirmary with his own money, now the Luzenberg Hospital, situated on the Champs Elysées Road, "so that those whose circumstances prevented them from receiving his advice at their dwellings, might for a comparatively small amount share equally with the more opulent the benefit of his skill and experience."[1]

Dr. Luzenberg delighted in performing little operations that required delicacy and skill. For examples: He extirpated the parotid gland in one case in which the common carotid artery had to be ligatured, "so profuse was the hemorrhage." Again he successfully excised a portion of the ileum in a case of strangulated hernia, after mortification had set in. Then again, he possessed a peculiar tact in operating for cataract, which he called couching for cataract. He is said to have rarely failed in the operation to restore sight, in part, if not completely.

With others, Dr. Luzenberg established at New Orleans the Medical College of Louisiana,

[1] *Op. cit.*

of which he was made Dean (1839). He was also instrumental in founding the Society of Natural History and the Sciences in the same city, and establishing the Louisiana Medico-Chirugical Society, at the first meeting of which Dr. Luzenberg was chosen president. This was in 1843. At this juncture, his health, always delicate, began to fail, and he was compelled to curtail his labors. He died in 1848, at the age of forty-three, full of honors, with the love and respect of his generation. Few men in the early century (19th) did more for the advancement of medicine in America than Dr. Luzenberg.

Operative surgery received a great impulse in the discovery of Anæsthesis. This discovery was the crying need of the hour, a discovery which the insect world knew very well—the mud-wasp, for example—but of which man still remained in ignorance, at least, was in ignorance, until the discovery of the anæsthetic properties of nitrous oxide, by Dr. Horace Wells, of Hartford, Connecticut, 1844. This gas was no recent discovery. Sir Humphry Davy had produced it late in the previous century; but it had never been used except in the laboratories, and its anæsthetic properties had never been suspected until Wells boldly had it administered to him for the extraction of a tooth. This was done by Mr. Riggs, of "Riggs's disease fame," without the least pain. It was certainly a great discovery and has immortalized its discoverer.

Dr. Horace Wells was born in Hartford in 1815, graduated in medicine in due course, and for many years devoted himself to dentistry at Boston, Mass.; later he returned to Hartford and continued there the practice of dentistry and to make use of the nitrous oxide in extracting teeth, and in many other surgical operations. Meantime, Dr. Morton of Boston discovered the anæsthetic properties of sulphuric ether, which soon, for a time, displaced the use of nitrous oxide in such operations. This was followed by a partisan controversy as to the priority of the discovery of anæsthesia. Priority was allowed to Dr. Morton by a committee of prominent physicians of Philadelphia, New York, and Boston. Nevertheless they were at fault, as the dates of their respective claims show, as maintained by the learned Thomas in his great work entitled "Biographical Dictionary." Dr. Wells's first use of the nitrous oxide was in 1841; the first use of sulphuric ether by Dr. Morton was in 1846. In concluding the points in controversy, Dr. Thomas says:

In weighing the respective claims of Dr. Wells and Dr. Morton, we feel bound, after a careful examination, to award to the former the credit of having brain to conceive of, and to carry to a successful issue, the use of anæsthetic inhalation in surgical operations, while to the latter belongs the distinguished merit of having done more than any other, or all others, to make this invaluable discovery known to people of all classes in both hemispheres.

Dr. Wells is alleged to have injured his health in his experiments upon himself with the various anæsthetic agents, and died by his own hand in 1848.[1]

William Thomas Green Morton, referred to above, who is credited with having discovered the anæsthetic properties of sulphuric ether, was born in Charlton, Mass., in 1819. He is said to have studied medicine, but devoted himself to dentistry. Moved, no doubt, by his fellow dentist at Hartford, Dr. Wells (some account of whom we have given above), Dr. Morton sought for a drug that would relieve, or mitigate, the pain of teeth extraction. This he found in sulphuric ether, and began to use it for that purpose in 1846, five years after the discovery of nitrous oxide gas by Dr. Wells, for the same purpose. Dr. James Jackson, of Philadelphia, denied the claim of Morton of being the original discoverer in this case, claiming priority for himself. A committee of his fellow-physicians, however, decided the controversy in favor of Morton. It was the most important discovery to the science and progress of surgery that was ever made; and also the greatest blessing to unfortunate humanity. To Dr. Morton, himself, it proved a curse rather than a blessing. Unlike a member of the profession of medicine, he was not content to turn his discovery over to the profession and humanity, but sought personal interest and profit by it, and

[1] *Vide* Ellsworth, *Life of Dr. Horace Wells.*

aspired to a position that should exempt him from the duty of earning his living. That was the business side of the situation to which he was in no wise oblivious. Receiving no grant or award from the State or National Government in return for his discovery, he appealed to the public, and sought the rich clients of members of the medical profession, whose names he secured from them, for contributions, and in that way collected large sums of money. From the *clientèle* of the author he must have received a thousand dollars or more. Morton lived to be barely fifty. Had he died a pauper, or committed suicide like his unfortunate contemporary, Dr. Wells, and declined to press his claims for remuneration, he might have kept his dignity, and retained the respect as well as the gratitude of mankind.

In 1811 was born another claimant for the gratitude of mankind—the immortal discoverer of the anæsthesis of Chloroform inhalations. Sir James Simpson, to whom we refer, was born in Linlithgowshire, Scotland, and graduated in medicine from Edinburgh University in 1832. He subsequently occupied the Chair of Obstetrics in that University; and was the first to use chloroform in his obstetric practice. This was in 1847, a year later than the discovery of Dr. Morton of the anæsthetic properties of sulphuric ether. Nevertheless, he may have been, as claimed, the first to use an anæsthetic in obstetric practice.

Dr. Simpson was the author of many works on

the subject of medicine, but his most notable was "Contributions to Obstetric Pathology." In view of his great and beneficent discovery of the anæsthetic properties of chloroform he received the Monthyon prize of two thousand francs from the French Government, was made foreign associate of the French Academy of Science, and knighted by his Government. Simpson died in 1870.

The science and art of Surgery needed at this period, in order to perfect itself, but one more discovery, that of Antisepsis. That was soon forthcoming by the genius of Sir Joseph Lister, the eminent English surgeon. Had he achieved nothing more than to demonstrate the need and means of protecting open wounds and operations from the infection of germinal matter in the air and the antiseptic properties of certain drugs against such germs of infection, his immortality would have been assured. After the discovery of anæsthesia, this discovery of Lister is the crowning glory of surgery. It was so simple a discovery that one wonders—is amazed—that it was never made before. When the British Medical Association met in Liverpool in 1896, the occasion was considered memorable by the presence of Sir Joseph, who was called "The Father of Antiseptic Surgery"; and "when the President characterized him as 'the most illustrious surgeon of our generation' the members arose from their seats and cheered him again and again."[1] There was no

[1] Emerson's *Nineteenth Century*, vol. iii., p. 1800.

François Magendie.

Lith. de Grégoire et Deneux, à Paris.

dissenting voice to that sentiment; no envious rival to rise to contest his priority.

It is not our purpose to underrate the importance of Sir Joseph Lister's contribution to the advancement of surgery; but simply to emphasize the fact that he who possesses the ability to collate and to combine the discoveries of his age into their logical relations in the furtherance of great ends, is not entitled to all the glory that is achieved thereby. The so-called "Listerism" was an evolution—the product of many minds. When one traces the origin of discoveries and inventions, one finds that there is less new under the sun than he supposed. M. Pasteur is given the credit of discovering "Immune Medicine," but it was practised by savages ages before that eminent sage was born. Tyndall had long before pointed out the danger that lurked in ordinary dust[1]; and, with Pasteur, had demonstrated that ordinary ferment was not oxidation, as it was generally supposed to be, but a germinal process; that any organic infusion would remain *in statu quo* indefinitely, if absolutely protected from dust in the air; that spontaneous generation was a myth; and that germination could not take place in an infusion excluded from the atmosphere, or the agencies that destroyed the microcosmic germs in the air. It is Tyndall, therefore, who laid the foundation for antisepsis, not only in the care and treatment of wounds, but also the care, preservation,

[1] *Vide* his lecture on *Dust Disease*, in *Nature*.

and preparation of food. The distinguished surgeon, Erichsen, in his great work on surgery, states the problem that has come to be known as "Listerism," in few words:

That the decomposition of fluids in wounds, their putrefactive changes, in short, are directly dependent on their impregnation with organic matter floating in the air, and hence deposited, or in other ways, conveyed to them; fermentative or putrefactive changes being thus at once set up in the fluids of the wound; that such local actions are capable of producing general septic infection of the fluids of the body; and further, that these organic products may be excluded from the wound, either by their destruction in the air by chemical agents, such as carbolic acid, or their separation from it by filtration, as by layers of muslin or cotton-wool.[1]

It is this doctrine and this procedure that have revolutionized nineteenth-century surgery. It was these facts and discoveries which were being unfolded by eminent physicists, early in the latter half of the nineteenth century, that helped the distinguished Lister to make his broad generalization, namely: Protect the blood from the infection of the air and other sources, and operations upon any part of a living body are perfectly safe. That was a proposition that Lister formulated in 1861. That was Listerism.

The discovery of anæsthetics prepared the

[1] *The Science and Art of Surgery*, eighth edition, in two volumes, vol. i., p. 35, 1884.

way, as if by some occult, or supermundane direction, for antiseptic surgery. This is the great achievement which the nineteenth century bequeathed to future centuries. To quote the words of the learned Erichsen again:

> The nineteenth century will ever stand out mightily in the annals of surgery as that in which the inestimable boon of anæsthesis was conferred upon mankind, by which not only has pain in surgery been abolished, but the extent of its operative department immensely enlarged, but they enable the surgeon to perform and the patient to undergo procedures, the agony of which would otherwise have been beyond the power of human endurance.[1]

It does not appear that Dr. Lister made any literary contributions to medicine and surgery. His contribution to medicine consists of his influence as a teacher, the variety of his operations and skill as an operator—aided of course by the discovery of asepsis, and antiseptic agents—in surgical operations and dressings. He was President of the British Association for the Advancement of Science for many years and attended its meeting in Liverpool in 1896, and was the recipient there of a warm ovation. He was then in his seventieth year. Honorary memberships were conferred upon him from learned societies all over Europe.

The merits of the several anæsthetics, discovered so nearly together, have been a subject

[1] *Op. cit.*, vol. i., p. 35.

of much controversy. All have had their partisans for many years. Europeans naturally preferred chloroform; Americans vacillated between ether and chloroform, but generally leaned to ether as being safer. Nitrous oxide was a safe and perfect anæsthesis, so far as producing insensibility was concerned, and more agreeable to administer, and less disagreeable to the patient; but it failed to calm and quiet the muscular system perfectly, which was indispensable in the more delicate operations. For the purpose of teeth extraction, however, it was perfect, prompt in its effect and rather pleasant; producing perfect insensibility, and leaving no unpleasant after-effects, such as nausea, dizziness, and prostration.

As to the other two, the consensus of medical opinion has given each its place—sulphuric ether for prolonged operations; chloroform for the briefer. For most persons, chloric ether is more agreeable to inhale, and insensibility is produced more quickly; but often the after-effects are distressing—chiefly nausea. To many persons it is unsafe, death from syncope being liable. Nor is sulphuric ether perfectly safe; the percentage of deaths following its administration, however, is less than from that of chloric ether. The inhalation of the former is disagreeable, producing great sense of constriction and pain in the chest—often painful nausea. These disabilities do not characterize the inhalation of chloroform; but a persistent and aggravating

nausea follows the administration of each. Moreover, a pneumonia has been known to supervene upon ether administration.

In the lying-in room chloroform outranks all other anæsthetics. It is an inestimable boon to the agonized and weary patient. It is prompt to take effect, and is needed in small quantities only, —two or three inhalations at the most—to be repeated as the exigency requires; and is followed by no ill-effects to either mother or child. The only objection that can be urged to its use is its retarding influence upon labor. This embarrasses the busy physician, however, rather than the suffering patient.

The use of all the anæsthetics is gradually drifting into the hands of specialists, with the effect to minimize the danger of their administration. Every hospital and every prominent surgeon have their own anæsthetizer.

These grand discoveries opened an era in the progress of the science and art of surgery, which their authors did not foresee. Most of them, indeed, died without anticipating the results to which they were destined to lead. Lister is the chief one among all who contributed to this amazing promise for surgery—that lives to enjoy its fulfilment. How his great and generous heart must swell with satisfaction! How grateful must he be to the gods to have lived to see the possibilities of his art realized beyond anything he had foreseen or dreamed! With an experience so unusual in

the lives of great workers and projectors in science and philosophy, Joseph Lister could die without a regret. He has seen the travail of his soul, which is permitted to few.

SIXTH: PERIOD OF THE NINETEENTH CENTURY

(*SIXTH DECADE*)

CHAPTER XVI

AN ERA OF QUACKERY

THE Hippocratian School of Medicine was on trial at this period. Never in the history of the world, probably, were cheats and knaves, frauds and false pretence so prevalent for the cure of diseases. The Cagliostros were everywhere present. The poor credulous people were the prey of quackery and charlatans the most arrant and heartless. The rocks, the fences, water towers, sides of hills and barns in the country and even the forest trees were ablaze with "All Heal" patent medicines. Inventors and shrewd vendors of them became millionaires and took their place among the earth's elect. Even the aid of the poor Indian was drafted to exploit Indian medicines, supposed to possess some mysterious healing virtue. The fakirs and fakes in miracle-working were abroad, reaping harvests from the credulous and superstitious. Spiritualism again had its rise. "The Fox Girls," as they were called, innocent-

minded, well-meaning folk from the interior, were producing table-tipping and wall-rapping intelligently to questions from the curious, at first without charge, but later at so much per hour. Magnetic Healers were producing miraculous cures for a fee, cases so inveterate and obstinate as to defy the powers and prescriptions of the Faculty; graduates in medicine, and undergraduates, who failed to win a *clientèle*, were vending patent and proprietary medicines to the gullable, warranted to cure all the prevalent chronic maladies, and reaping a harvest of millions; Churchill of Edinburgh was out with his "wonderful" preparation of hypophosphites of lime and soda for the cure of a disease of the nature of which he was totally ignorant (tuberculosis), which smoothed the way of thousands to the grave; electric baths were being installed, which, it was claimed by their inventor, would extract mercurials from people whose systems had been overloaded with them, by the process of electrolysis[1]; the Ling system of "Movement cure" was being exploited, as also was Taylor's "Antiflexion cure"; light gymnastics and heavy, and the Butler "Health Lift" were much in evidence for flaccid muscles and neurasthenic conditions; the Phrenologists were busy reading character at one

[1] It was a fake, of course. It was subsequently discovered that the crude mercury found in the bath of such patients was surreptitiously put there by the proprietor. But the business went on just the same.

dollar a head, advising parents as to the most fitting occupations for their sons; and, finally, the celebrated Sylvester Graham, who was no fakir, appeared in New York with his panacea for the physical ills of mankind, namely, bread made from unbolted coarse-ground wheat flour, which still bears his name, "Graham Bread." Upon the character of this remarkable man we must dwell a moment.

Sylvester Graham was born in the eighteenth century (1794) at Suffolk, Connecticut. He was educated for the ministry at Amherst College, but entered the cause of temperance under the auspices of the Pennsylvania Temperance Society, in which work he thought he could be of more genuine service to mankind than in the ministry. Perceiving that the habit of drink was not caused by the thing drank, he changed his course and began a crusade against the primary evil, which he considered to be errors of diet. To the morbific and stimulating dietary of flesh, he attributed the cause of the drink habit, and many of the diseases that afflict the race. He was thus led to the advocacy of a vegetarian diet and bread made of wheat flour in its natural unbolted state.

Graham was by nature a reformer. To the amelioration of the evils that afflict mankind he devoted his life. The course of lectures on "The Science of Human Life," which he delivered in New York late in the forties, was largely attended and created no little interest. Indeed, he aroused

a large following in that city. Apart from the learning which he displayed, the perfect familiarity with his theme, his zeal in the cause, he was a fluent and a popular speaker. His expositions bristled with facts and figures; physiology was on his tongue's end, and natural history furnished him with proofs and demonstrations of his contention. He divided mankind dietetically into two classes, the overfed and the underfed, and believed that the overfed were the greater sufferers. Flesh food ministered to the animal instincts, he claimed, with much truth. It seems an incongruous proceeding to feed criminals, especially the insane criminals, so largely upon a diet of flesh. It certainly is an error, which will be remedied when the civic authorities and superintendents of criminal institutions have time to look into the subject. However that may be, these lectures were published in book form and passed through several editions. Nothing perhaps could give a clearer idea of the high purpose that moved Graham in his career than the preface to the English edition of his work, which was published in London in 1849. In the opening paragraph he says:

The work which I now present to the public in a printed form is the result of observations, reflections, inquiries, investigations, and researches for more than forty years; nearly a fourth part of which time has been exclusively devoted to it with an assiduity which has almost wholly sacrificed my

social enjoyments of life, and taxed my mind and body to a degree which has greatly impaired the vigor of my health, and probably in no small measure abbreviated the period of my earthly existence. And yet, I am very far from being satisfied with what I have done. I feel that if I could have ten years more of health and opportunity, I could greatly perfect the labors of the past ten years. In regard to the great principles which I have advanced, and all the practical bearings of those principles, I feel the most entire confidence, and have no wish for longer time to satisfy myself of their correctness; but I think that with more time and labor I could, in many respects, improve the method in which I have presented them, and give more strength to the argument and force to the illustrations.

But the amiable ambition of this highly devout and conscientious man was not to be realized. He died in 1851. He was at the time of that writing in failing health, exhausted by the intensity that he gave to his work. We cannot believe that Graham overrated the importance of food and diet upon the welfare of man physically and morally. Scientific men are slowly but surely awakening to the subject. He has been in the grave more than fifty years. It would rejoice his heart could he behold the fruits of his labors in the work of a Fletcher and a Chittenden and hosts of lesser lights in both hemispheres.

Following closely in the wake of Grahamism came the Water-Cure movement, which had an obscure beginning in a small hamlet in Austria

in 1826 and spread all over the civilized world. Its founder, or *inventor*, as the French would say, was a peasant of Graefenberg, who, having met with a serious injury, the nature of which is unknown, "cured" himself by the free use of cold water. This simple circumstance gave him the idea that cold water might be useful in all diseases. He therefore began to advise it for his friends and neighbors, and with such success as to embolden him to open an establishment provided with conveniences for the application of water in a variety of ways to a variety of chronic ailments. His experiments were attended with such success that it was soon noised abroad, with the result to overrun his institution with patients. Invalids went to him from all parts of Germany, and erelong from all parts of Europe. Their number exceeded one thousand annually. He called his system the Kaltwassercur, which ultimately was given the more classical cognomen of Hydropathy, or, more properly, Hydrotherapeia. It comprehended nothing but the use of water in varying degrees of temperature, from ice-cold to steam. It abjured bleeding, blistering, the use of depletives, aperients, laxatives, all medicaments whatsoever. The dietary was simple and abstemious; the general regimen strict and severe. There was little variation in the treatment of his patients, whatever the disease, only modifications of it according to the endurance of the person. The ruddy and corpulent rheumatic had his cold water

bath, or cold plunge, from 40 deg. to 60 deg. Fahrenheit, first thing in the morning, and was required, in some cases, to walk several miles before breakfast. Others less hardy had a morning rubdown with a sheet wrung out of cold water, followed with a dry rub. Then there were local baths, sitz baths, foot baths, arm baths, shower baths, the cold wet girdle to sleep in, compresses; epithemes to the epigastrium and the hypogastrium, for swollen and deformed joints, the lumbagos, etc.; the cold wet pack in the afternoon for an hour, imbibing copiously of cold water meantime. The cold wet pack was recommended especially for old smokers, the nicotine-soaked cases, or cases in which the blood was supposed to be foul from other causes. In smoking subjects the fumes of the sheets when they were unpacked were strong of tobacco, as we can attest, which was proof of the hydropath's contention. These processes occupied each case from morning until bedtime. The strictest obedience was exacted from all on pain of dismissal. His cures were remarkable, but chiefly confined to subjects to which the treatment was adapted,—the plethoric, the rheumatic and gouty, and women made neurasthenic by luxurious living and idleness. His failures were also frequent, if not remarkable. These were not reported—"men mark the hits, not the misses," observed Bacon.

The inception of this strange phenomenon was in the person of one Vincent Priessnitz, an unlettered peasant, without learning or pretence

of learning; but a man of strong force of character. He was born in 1799, and died in 1851. The Kaltwassercur which he established at Graefenberg did not long survive him, nor he it; but it grew into large proportions elsewhere, of which some account should be given here.

The exploits of Priessnitz had a world-wide influence. Not only did they revive the long-neglected interests in the use of water as a curative agent, and the bath as a wholesome luxury in the home which the ancient Greeks and Romans knew how to utilize so well, but they led to the establishment of a new industry. Water-cure centres sprang up all over Germany. Wherever there was a gushing spring of water, "Badhäuser" were erected; and if the springs were of salts, or of sulphur, their medicinal virtues, of which nothing was known, were endlessly dilated upon. Beautiful little hamlets sprang up about these springs, from the profits derived from them, such as Wiesbaden, Carlsbad, Schlangenbad, Carlsrhue, Wellsbach, etc., with hotels of great luxury and most luxurious bath appointments. Even the German Government engaged in the business and fitted up watering-places in the most extravagant and picturesque manner, which it leased to proprietors. The whole world contributed to maintain these establishments. Multitudes of the idle, affluent classes resorted to them, to drink the waters and to bathe in them. That many were benefited by them must be conceded, chiefly,

however, through the strong belief that the recipient had in their healing virtues. That many were injured must likewise be conceded. While one may admit that these mineral waters possess curative virtues in certain disorders, the number of such persons who suffer from such disorders is limited; and it is difficult to determine the cases to which the waters are curative or otherwise. Where one person may be benefited, there are a hundred that are positively harmed and their life shortened thereby. Such, at least, is the opinion of some of the wise heads who are professional consultants at these institutions.[1] If the solvent powers of water constitute its chief virtue for the purpose of drinking and bathing, there can be no question as to the superiority of pure soft water over mineral water, since the addition of any extraneous substance, especially of a mineral nature, would impair its solvent properties and largely therefore its curative virtues.

The water-cure craze did not infect England so much. England had few springs of salts of Glauber, or Seidlitz, or of sulphur; but it furnished Germany with a large quota of persons in search of them. For the water cure proper, however, many institutions were reared in her picturesque places, the most noted of which was Malvern, under the supervision of Dr. Wilson. That institution was at one time, at the period of which we are writing, very popular and deservedly so.

[1] Personal observation and experience.

It was conducted upon more conservative and less pretentious lines than many of the similar establishments which were being founded in America.

Naturally, in the more liberal and less conservative atmosphere of the New World, any new thing that promised well for business and profits was seized upon with avidity and pushed to great extremes. It was so with the water cure. There were many physicians who, seeing the evils of heroic medication, were ready to embrace any method of treating disease with small doses, or no doses at all, or pretence of doses, that offered any prospects of success. We must concede that among others homœopathy afforded them this opportunity. The consequence was that hydropathic institutions were established all over the States, and were generally well patronized; and homœopathic colleges founded, to flood the country with homœopathic physicians. Proprietors of the baths were not always graduated physicians, for that formality was not necessary to qualify them for giving water treatment. But they were all "Doctors"—and some of them carried that dignity and sustained it very well. A few of these institutions still exist in an enlarged and improved form, with Turkish and Roman baths, electrical apparatuses, massage, psychotherapeia, rites of religion and religious services, etc. Some of these modern institutions had graduated physicians in charge of specialties, and later, introduced laboratories

for chemical, pathological, and bacteriological work, and extended the scope of their therapeia to embrace the whole pharmacopœia of medicine. That was a stroke of business, since they escaped thereby the opprobrium of quack.

In the city of New York the Kaltwassercur assumed large proportions. A very reputable gentleman, Dr. Joel Shew, in 1850 embraced water cure, opened an institution, and established *The Water Cure Journal*, a very pleasant, readable publication, in which water cure and water-cure books and publications were duly advertised. The Messrs. Fowler were the publishers. Dr. Shew wrote and published at that time (1853) a book entitled "The Hydropathic Family Physician." In this book of considerable size, an effort was made to show that water in some form, or mode of application, covered the whole range of therapeutics. Dr. Shew died in 1855, but a man of different type succeeded him, not a better man, but a man of greater force and learning, and therefore of more interest to medical history.

Hydropathy in America would have excited but an ephemeral interest had it not been for the genius of Dr. Russell Thatcher Trall. Trall was a well educated man, born at Vernon, Connecticut, in 1812, and graduated at the Castleton, Vermont, School of Medicine. He went to New York about 1850 and began practice. Being unsettled in the tenets of scientific medicine, and of a radical, positive, and aggressive bent of mind, he fell an

easy victim to the fascinations of Sylvester Graham and the vegetarian hypothesis, and was ready to accept any method of practice, except homœopathy, which he utterly despised, that would supersede the use of drug agents. This he professed to find in hydropathy, and embraced it with all the zeal of his ardent nature. Dr. Trall, it would be easy to believe, was a re-incarnation of Sextus Empiricus of Roman renown. He doubted everything and disputed everything. He was Adversus Medicos at all times. He was intensely absorbed in his ambitions, or, more accurately, concentrated in himself and his personal advancement. This made him selfish, illiberal, intolerant, ungenerous toward those that differed from him often to the degree of discourtesy. On one occasion a physician called upon him, who had a patient suffering with some form of skin-disease, and asked if he might be permitted to send him to the institution under Dr. Trall's care for baths, desiring, however, to retain the patient under his own care, for *medical* treatment. "Very well," replied Trall; "send his skin to me and I 'll attend to it!" Naturally, the physician felt that he had been insulted, and retired without ceremony.

Dr. Trall wrote voluminously and in good English. He became editor of the *Water-Cure Journal* after the death of Dr. Shew. He was anti-tobacco, anti-drink, anti-flesh-eating, anti-salt, anti-drugging, anti-slavery, anti-vaccination,

anti-vivisection, anti-everything except Graham bread and water. He wrote prize essays upon the first two subjects. He also published a treatise on "Sexual Physiology"; "Uterine Diseases and Displacements"; "The Proper Food of Man"; "The Hygienic Cook Book"; "Water Cure for the Million"; a "System of Light Gymnastics"; and the "Hydropathic Encyclopedia" in two volumes, which embraced his system of medicine, beginning with anatomy and physiology and ending with theory and practice. In his pages the erudite author showed familiarity with medical history, the works of the masters both ancient and modern, and controverted many of them, especially the Chemico-vitalists, and the Chemico-physiologists, involving problems in mind and matter on which the medical profession was divided at that time. To Professor Martin Paine's "Institutes of Medicine" he gave great praise. Good's "Study of Medicine" was his model.

The work for which Dr. Trall deserved the most credit, however, was his Physiological School, which was established in 1853, to which he admitted both sexes. Adjoining this school was his Hydropathic Institute, which was generally overflowing with chronic invalids of both sexes. Upon these he drew for illustrations of his lectures, and later for his weekly clinical lectures to his students of medicine. The school was successful numerically and in the character of its

pupils. Being a dress reformer, "Bloomers" were admitted to his classes. Encouraged by the success of that enterprise, in 1856 he applied for, and obtained of the Legislature of the State of New York, a charter for a medical college under the title of "The Hygeio-Therapeutic College of New York." This charter put the institution on the same footing legally with other medical schools, and empowered its Faculty and Board of Trustees to grant diplomas to such as fulfilled the requirements of the curriculum and passed the Board of Censors. The College in 1857, had a large class of pupils made up of men and women of all ages, mostly aspirants for reform work, and was pre-eminently successful for a time, but finally lapsed by the imperious conduct of the president in overriding and disregarding the wishes of a majority of his faculty.

Dr. Russell T. Trall was a man of austere habits and of excellent moral character. His irascible temper was his chief infirmity. It amounted to a *vice.* His diet was most simple and abstemious, consisting chiefly of Graham bread, hard Graham crackers, fruits, and nuts — two meals a day, without salt. He neither drank tea, nor coffee, nor milk—nothing but pure soft water. His industry was most indefatigable. He gave himself no vacations, and but little sleep; of recreations, none. He had a promising son who grew to young manhood and died of smallpox, the father refusing to have him vaccinated. This unhappy

experience did not mollify his aversion to vaccination. He left in MS. a voluminous work on the "Institutes of Medicine," a very important contribution—the only important contribution to the profession that he ever made; but it was never published, as his career was suddenly terminated by death in 1877, leaving no one to succeed him, to look after his interests, or to do him honor. His cardinal principle in practice was Expectancy. He insisted that there were no remedies for disease; that it was nature—the *vis medicatrix naturæ*—that cured malady when cured at all.[1]

Many of the pupils that graduated at the Hygeio-Therapeutic College began the practice of homœopathy after reading the "Organon of Medicine" and acquiring German; others went to country towns and established "Cures" of their own; still others went on lecture tours to indoctrinate people in a knowledge of the laws of health, though they knew as little about them as did their mothers before them. All know the elements of hygiene and perhaps a few of the laws of their own health: but it may fairly be considered rare that one person knows the laws of health of anyone else. That knowledge could be acquired only by a thorough examination of an individual's organic peculiarities and his relations to the elements of hygiene by an expert in physical diagnosis. Some persons require warm rooms and warm

[1] Personal knowledge and recollections.

weather for health; others thrive better on low temperatures. The German philosopher, Immanuel Kant, was comfortable rolled up in furs in summertime, and winter was very trying to him. Some people need a daily bath, and still will be unclean; others would be injured by it, and require only an occasional bath, two or three times a week in warm weather: two or three times a month in cold weather. We knew a man of eighty belonging to an old Knickerbocker family of New York, a rich old miser, who could not remember when he had had a bath! His condition justified the statement. A Turkish bath was ordered for him and he was made sick by it. He declared that he would never take another if he lived to be a hundred. There are aquatic animals that thrive in water but man is not one of them, though one of that genus and species may now and then be observed who finds delight in that element. "Obey the laws of health," said these Sanitarians, "and you will never be ill." If they had said "Obey *your own* laws of health and you will never be ill," the maxim would have possessed some meaning, however little of force, and showed that the semi-educated graduate had a correct idea of what he was talking about. It occurs to us that if mankind would cultivate the *conditions* requisite for health and longevity, the *laws* of health would take care of themselves.

One of the more prominent pupils of Dr. Trall was Dr. M. L. Holbrook, born at Mantua, Ohio,

and educated there, who graduated at the Hygeio-Therapeutic College in 1858, and who adhered consistently to its teachings until death ended his career in 1906. He was a man of most excellent character, sincere in his opinions and friendships, and inflexible in his purpose. He founded and edited the "Herald of Health," and wrote many treatises and handbooks on general and special regimen in health and disease. Being a stanch vegetarian, the most of his medical aphorisms were predicated upon diet. Many of his suggestions were wise and judicious. He was a student of nature, a good botanist and microscopist, and lived mainly in his library—a genial, devout lover of nature, of God, and his fellow-men.

The disciples of Hahnemann were busy at this time. Their number had augmented many fold. Not only had there been a large influx from Germany, but their ranks had increased by proselyting at home. The School of Homœopathy that had been founded in the last decade at Philadelphia was graduating increasing numbers year by year. Philadelphia was at this time the homœopathic centre. It had many eminent practitioners of the homœopathic faith; and eminent professors occupied Chairs in their colleges. One of these learned gentlemen indulged in fanciful conceptions of the genesis of poisonous herbs which had the mark of originality. He wished of course to respect the scholastic dogmatism of Christianity, and to justify the

wisdom of the Creator in their origin; and knowing the truth of the maxim, "Ubi viri, ibi vertis"—that the choicest remedies were the most violent poisons, he made the deduction that the sin of Eve brought disease and death into the world, and had, at the same instant, blighted the flowers and herbs of the earth, so that what were pure and harmless before, became corrupt and poisonous. Thus he might have reasoned: As by sin disease came into the world and drugs by disease, so by drugs disease shall be destroyed.[1] This was a *reductio ad absurdum*, of course, but it showed the trend of the homœopathico-metaphysical mind.

New York was now moving to found a homœopathic school of medicine of her own, and succeeded in doing so in 1857, through the munificence of her public spirited citizens. Many gentlemen of excellent standing in society and the profession, whose affinities for the old school of practice had become weakened, joined the new. The college established by them was the work of apostates from the ranks of the Hippocratians. Its faculty was composed of old-school men, or at least, graduates from regular medical colleges. Large numbers of students, graduating from these medical institutions, immediately went over to homœopathy, not always from principle, more often in deference to the wishes of their friends and mothers, who had become enamored with the new doctrine, and saw in it a more speedy and

[1] Hempel's *Materia Medica and Therapeutics*. Introduction.

lucrative practice in prospect. Then, too, its practice was so simple and nice!

About this time the Homœopathic Medical Society of the County of New York was formed, with many excellent names enrolled. King's County followed suit a little later. Later still, they established, with the help of Albany County, a Homœopathic Medical Society of the State of New York. The legislature of the State, meanwhile, had placed these societies on the same legal status as the old school, with all the rights and privileges that had been accorded to the regular medical societies and schools.

But the course of the new school which looked free and clear was by no means smooth. Its members were torn with dissension. The Simon-pure Hahnemannian, with his infinitesimals, who discarded the lance and scalpel, and even the poultice in the treatment of apostemes, morbid growths, and acute inflammation, and relied upon the similimum to discuss them à l' Organon de la Médecine, found it difficult to affiliate with homœopaths of the cruder sort, who were low potency men, and who separated surgical diseases from those of the dynamic. As a striking illustration of the hold which the power of the similimum in small dose had over the mind of otherwise sensible men, we cite an amusing incident that came to the writer's knowledge. A gentleman had fallen in the street and broken his leg. He was carried home and the family

physician summoned. The latter was a homœopath of the infinitesimal type, a learned man in his way, of excellent character and standing, being a brother of our foreign minister at the Court of St. James. Meantime, a surgeon was sent to the patient from whom the circumstances are gathered. The surgeon, also a homœopath, but not a fool, found the doctor reading a homœopathic materia medica in the endeavor to find a drug whose pathogenesis covered the patient's symptoms and sufferings. Finally he said to his colleague, the surgeon, "I have found the similimum; it is *rhus toxicodendron.*" "Very well," replied the surgeon, "the man has a broken leg. When I set that you may proceed with your similimum."[1]

The control of the college was at first under the high dilutionists; then it passed into the hands of the crude or low dilutionists. The warfare between these sects was more bitter than between either of them and the old-school practitioners. "Mongrel" was the epithet hurled at these very respectable gentlemen of low potency persuasion, who did not see why they could not be homœopaths without being damn fools! They wished to be homœopaths, but at the same time to be broadly medical, with the privilege of entering the sick room without shackles. However plausible this argument looked, it was regarded as specious. According to "Sacred writ" (the Organon), by

[1] The author had this from the mouth of the surgeon who officiated in the case.

which they swore, these latter gentlemen were not homœopaths at all. Their position was most inconsistent. They wanted to be on the popular side without accepting its principles. Their place was with the old-school folk whose tenets and ethics were surely broad enough to enfold them. They were physicians with liberal sympathies, and would have found congenial companionship in the schools and societies of the Hippocratians. The latter were not all bigots.

For reasons inscrutable to us they thought and acted otherwise. The warfare went on, but the control of the college erelong turned back into the hands of the high dilution men, with exceptions here and there among the faculty. Loyalty to the sceptre, however, continued to dominate the high dose men, or Hahnemannians. Their ranks were gradually depleted by death, and successors were not forthcoming to fill their places. By this means the *practice* of homœopathy became by degrees more rational, though its doctrines remained in force — unmodified until near the close of the nineteenth century, when the following resolution was adopted by its (N. Y.) State Society (1898): "A homœopathic physician is one who adds to his knowledge of medicine a special knowledge of homœopathic therapeutics and observes the law of Similia. *All that pertains to the great field of medical learning is his by tradition, by inheritance, by right.*"[1]

[1] The italics are theirs.

Another phase of this movement should not pass unnoticed, namely, the flood of homœopathic literature with which America and England were being deluged. To the dispassionate judgment it was an ill-timed and unwise procedure. It had a mercenary look, wholly inconsistent with the dignity of a self-respecting profession. Nevertheless, many self-respecting gentlemen indulged in it. We are not referring to medical journals, published under the auspices of its schools of medicine in the interest of medical knowledge, but to the publications of works on "domestic practise" for the use of families. Great numbers of such books, which required a case of medicine to go with them, the strongest remedy in which was the one-one millionth dilution, perfectly harmless, of course, to a baby at the breast in any dose, were published in various parts of the country and had a considerable sale. Homœopathic publishers were partly responsible for thus prostituting the homœopathic profession to a commercialism so rank and degrading. With the true instinct of gain they saw their opportunity to win money and took advantage of it. The authors of such books, however, were equally to blame for the discreditable anomaly—many of whom saw their error and lived to regret it.

This was an era of pronounced activity in the medical world. Homœopathy had produced an incentive to the study of medicine, especially homœopathic medicine, which the aspiring youth

of both sexes were not slow to improve. The requirements of graduation in medicine at that time were not very exacting in any of the schools. The law required of the candidate a three years' study with some regular physician, and two courses of lectures in a medical college. The latter required as a condition of a diploma a thesis on some medical subject, written by the applicant, and that he pass a satisfactory examination before the Board of Censors. No preliminary preparations were required other than a common-school education and a good moral character. The time spent in study under the preceptor was often a mere formality. He was of service in the office in macerating plants and making infusions, pulverizing roots and chemical salts, performing simple chemical experiments, dissecting cats and dogs, etc., but of real study there was little, unless the student had a taste for it. At the lectures he was more or less attentive—often less; and the thesis, the bugbear of the last term, was often written for him by some friendly professor, or a chum possessed of more literary ability than himself. It was an easy matter, therefore, to win a medical diploma in New York or Philadelphia in the sixth decade of the nineteenth century; less easy, though not very difficult, in London, Edinburgh, or Berlin. If the young graduate in an American college had means to warrant a trip abroad, he spent a few weeks in Edinburgh, London, or Paris to receive

the finishing touches of his education. So notoriously lax were the requirements in the American schools of medicine to fit a student to practise, that there were until recently but two medical colleges in America, the College of Physicians and Surgeons and Bellevue Medical College, a certificate from which would be received by any of the principal medical schools of Europe. The New York College of Physicians dates back to 1807; that of Bellevue Medical College, to 1860: previous to this last date Bellevue was a hospital simply, in which clinical lectures were given and to which medical students from all parts of the country had access at five dollars per term of six months.

As great as the supply of physicians was at this time, the demand was yet greater. It will be observed that the knowledge of hygiene was very meagre. One heard much about it since Graham's incomparable lectures, but only a little was known about it. No college had a Chair from which it was taught: nor was there much real knowledge on the subject to teach. The question that occupied the medical mind at that time was mainly what could cure disease, rather than how to prevent it. The Regulars treated maladies *secundum artem;* the Irregulars, ambitious for popular favor, were concerned with the business of finding a similimum for each disease, feeling assured in their short sight that every disease had one. The causes of malady were not known

to them, nor was such knowledge cared for. Pathology was neglected; nor was it needed by the symptomatologist. The term prophylaxis was not in their vocabulary, their function being to cure, rather than to prevent malady. That knowledge would throw no light on the treatment according to their method. Such measures as were being instituted, looking to the prevention of disease, we must credit to the regular profession. A Board of Public Health had already been established in London, Edinburgh, Paris, Berlin, New York, Boston, and Philadelphia, and a few other large cities, whose function it was to inspect the water-supply, sewage, unwholesome meat, etc. State Boards of Health were subsequently established in various states with a similar function. Massachusetts was the first to lead in this matter in America.

We have observed that physicians were in demand at this period. The number had been multiplied during the decade, and diseases had multiplied also. Besides the increased numbers of licensed physicians, there was an army of quacks and pretenders who were reaping harvests. Dysentery was prevalent; so also was typhoid fever the year round, but especially so in the winter months. Tuberculosis was always present and fatal. In New York toward the end of this decade there was an epidemic of diphtheria, attended with great fatality. It had previously raged on the Continent of Europe. Historically,

the disease was not new, but it was new to the younger physicians of New York. Aretæus, a celebrated Greek physician, who lived in the second century, A.D., according to Le Clerc,[1] wrote the first description of the disease that has come down to us.

Aretæus is credited with having been the first to describe diphtheria, but with doubtful propriety. He was a Greek, a contemporary of Galen, a man of ability, having like Galen acquired a knowledge of anatomy and physiology at Alexandria. We have already referred to him (Vol. I, Chap. IV). He had a correct idea of the insanities, as being maladies to be treated on rational principles. Melancholia he attributed to disordered bile. He wrote a very important work in eight parts on "The Causes, Symptoms and Cure of Acute and Chronic Diseases" which is still extant. Aretæus describes two varieties of throat affection in his treatise on medicine which has been translated by Le Clerc into French, neither of which corresponds with the diphtheria of to-day. The first variety was characterized by inflammation of the throat, tonsils, amygdalæ, and epiglottis, with difficult respiration; the other variety appeared to be more of an asthma. It was not a phlegmon; there was no inflammation of the fauces nor swelling; but rather a dryness and a constriction (*refferrens*) of the throat with suffocation. The breathing (l'ésprit) alone was involved.

[1] *Histoire de la Médecine*, p. 508.

Le Clerc believed "L'estime que c'est, l'ésprit seul qui souffre."[1]

In the epidemics of sore throats with which the people have been afflicted from time immemorial, this peculiar form of malady has frequently appeared. An epidemic of it was especially fatal in Spain at the close of the sixteenth century. Villa Real, a Spanish physician of note, of the following century, wrote a description of it, which accords with its symptoms as it is known to-day. He termed it morbus suffocans. It was also prevalent in Sicily in that century, where it was known as gulæ morbus, latinized, morbus strangulatorius. The disease in that epidemic was of a malignant character and of great fatality. About the middle of the eighteenth century, the disease appeared epidemically in France, Italy, and other parts of Europe. At the same time it invaded Sweden and Stockholm, Upsala and Rasbo. At the close of the eighteenth century it made its appearance in the New World, with all its dread symptoms of malignancy. It was reported to have been the cause of Washington's death, which occurred so unexpectedly in 1799. In 1818, France was again afflicted with the malady with great severity. M. Bretonneau, a distinguished French physician, described the disease in 1823 with great particularity, and on account of its being attended with a membranous exudation, christened it diphthèrite, hence the English

[1] *Histoire de la Médecine*, p. 508.

diphtheria. An English physician of prominence at a later period, in London, Dr. Greenhow, wrote a treatise on the subject, without, however, throwing much light on its nature and causation or treatment.

As we have said, the malady was very prevalent in New York at this time. Its treatment was antiphlogistic, with the use of the salts of potassa gargles, and the potential cautery; poultices, perchloride of iron in small doses; steam inhalations; inhalations of slacking lime in desperate cases; with bark and wine, whiskey and beef tea to support the patient. The disease was very fatal. The trachea was opened in extreme cases for relief of respiration, sometimes with success. At a later period the "Intubation method" of Dr. Dwyer was introduced successfully. The homœopaths claimed to treat the disease successfully with kali bichlorate, the iodides of mercury, belladonna, all in infinitesimal doses. The decillionth dilution of the virus of the trigonocephalus, or three-headed viper, was regarded by many of them as a specific. A specimen of this virus was brought to America from Germany about this time by Dr. Constantine Hering, a very excellent gentleman and thoroughly trustworthy, who had proved the specific properties of this virus upon himself, producing throat symptoms, but not diphtheretic,—and a very elaborate proving it was. The average mortal cannot help being sceptical of provings of viruses taken by the mouth,

since all know that the salivary secretions destroy such poisons. Nevertheless, a very learned and experienced physician of that school of this period avowed that he always treated his cases of diphtheria with the smallest attenuations of that virus, and had never lost a case under its administration.[1] The gentleman was a truth-speaking man and of excellent standing in his sect,—was regarded as an authority, in fact. Other physicians made use of the alcoholic treatment, administering small doses of it, diluted fifty per cent., frequently repeated, and swathing with alcohol several times a day. Gratifying results were reported by this method.[2]

It is interesting to observe that diphtheria was not regarded as either infectious or contagious, and that at first no quarantine was practised, and no antiseptic nor fumigations used to prevent the spread of the disease. Nevertheless, single cases of it might frequently be found in large families of children. Such a circumstance was phenomenal, however. The disease once in the house was likely to infect the whole family, more or less. It was emphatically a house disease. While it was more prevalent in the slums and crowded tenements, the disease was not confined to them. It invaded wholesome sections of the city, the luxurious homes of the affluent, the palace as well as the hovel. Sleeping apartments with luxurious

[1] Personal knowledge.

[2] A method introduced by the author in 1880.

appointments, with hot and cold running water were inviting places for its invasion. So conspicuous was this fact that there was no escaping the conclusion that the malady was due to infection from defective drainage and sewer traps, a conclusion which was justified by investigation. The scientific plumber did more to banish the disease and allay the epidemic than the remedies of the physician. Reformed plumbing, open closets, ventilated traps, soon put an end to a disease the rate of mortality of which was higher than that of small-pox and next to that of the sweating sickness.

The uncertainties of differential diagnosis led to the confounding of ordinary angina tonsilarius with diphtheria, which often misled the practitioner into believing that he had cured a case of the latter malady when it was a case of the former. In that way, remedies often got the reputation of possessing virtues which they did not have. The probability is that the learned gentleman who declared with emphasis that he had had many cases of diphtheria under his care and had cured them all with lachesis—a snake venom—had mistaken simple ulcerated throat for diphtheria. An error in diagnosis of that kind might easily be made; for at that time the two diseases were easily confounded, especially in their early stages. Both diseases involved ulcerated throat, fauces, and tonsils; both were inflammatory with frequent pulse and high tem-

perature; and the difference that characterized diphtheria from angina was the projection of the ulcer *on the tonsils* in diphtheria, rather than its depression below its surface, as in ulceration, and the swelling of the submaxillary glands. One was infectious; the other was not. If one had a sore throat with tumefaction of those glands and diphtheria was epidemic, the diagnosis was regarded as conclusive; the case was the latter disease. Such was the conclusion, but as likely to be wrong as right. But obviously enough, it was often wrong. As has been observed, the disease was not isolated, nor was it reported to the health authorities, except in case of death. At that time there was no ordinance in the City of New York requiring the report of contagious diseases, even of variola, or typhus fever, cholera cases, or yellow fever, the last, a more fatal disease than any of the others. The barbarism of entering a home or a hotel and carrying away to the pest-house an individual suffering from variola or yellow fever was not then practised. The sentiment of humanity prevailed over the fear of the disease.

Many were the remedies with vaunted specific virtues advanced for the cure of diphtheria. Some of them no doubt modified some of the worst features of the disease. A more intelligent hygienic regimen was also of service to the same end. But the true specific against the malady was its own specific germ as modified in the blood of the horse, called "horse-serum," or antitoxine.

This unique discovery, which really does not belong to the period of which we are writing, immortalized the name of Loeffler, and marked an epoch in physical diagnosis and the progress of medicine.

Typhoid fever was another concomitant of civilization, which, as we have observed above, was unduly prevalent and fatal at this time. The proximate cause of it was known, but its specific cause had not been discovered. Its source, also, was a matter of controversy. It was not like diphtheria, a house disease. It was pretty well settled, however, that its source was infected or impure water, as was that of dysentery, likewise. Water from surface wells was a prolific source of infection; water from cisterns, barrels, hogsheads, etc., pure, soft water, distilled from the clouds and caught from roofs of dwellings, which was such a prize to the washerwoman and housekeeper, and which was often treated with ice and used for drinking purposes, was also a source of typhoid fever. At this time surface wells were prevalent in the cities of Europe and America, and most well-appointed houses had their reservoirs of cistern water. A public pump might be seen now and then adjacent to a graveyard, and in the country the pump or well was usually in close proximity to the barnyard, or house surface drain—for convenience' sake. These farmyard pumps were useful for watering milk sent to the city, before the edict against the

practice, not suspecting that they were infecting the milk with germs of typhoid. Nor did the health authorities suspect it. Bacteriology was awaiting the discoveries of the subsequent decade.

At this time the mortality of the race was dreadful to contemplate. Half the human race died before reaching the age of five years in London, Paris, and New York; nearly a third of it died in infancy before reaching its first year, poisoned to death by infected food and air. The average term of life was forty-five years. This last was largely influenced by the fatality of certain trades and industries, such as mining, smelting, grain-grinding, steel-polishing, dyeing and coloring establishments, the chemical laboratories, tunnelling subway excavations, etc., etc., some of which are very fatal, especially polishing iron, copper, and steel, coal-mining, etc. At this period the steel polisher barely lived seven years at the work. And as to coal-mining, apart from the fatality of accidents, we have no statistics accessible, but its fatality was very great. It is to-day a sickening sight, in visiting the coal-mining districts, to witness the wrecks of humanity that strew the highways, as a consequence of a few years in the mine! If these things are inseparable from the civilizing process of humanity, one is inclined to question if it be worth the cost.

The treatment of typhoid fever was empirical. There were no specific remedies for the disease to be found in the pharmacopœias of scientific

medicine, and it was to the credit of the dominant wing of the profession that it put forward no claim to any. The procedure of treatment was Expectant and rational—knowing the dangers that beset its course the treatment comprehended guarding the patient against them. The strictest hygiene and regimen were enforced. At the outset the bowels were freely moved with calomel and castor oil; later they were not to be disturbed, though it was regarded good practice to give fractions of a grain of calomel now and then. Quieting and soothing medicines were prescribed and a diet of broths, Liebig's extract of beef, milk, and demulcent drinks advised. Bathing in hot stages with cool water or water and alcohol. Whiskey or brandy was sometimes exhibited in small doses; now and then opium or morphia—in small doses to quiet the restlessness of the patient. At a later period the cold wet pack was resorted to in the hot stage of fever; but it had a short run. Under this course of treatment, modified of course to suit exigencies, the hospitals reported a fatality of twenty per cent. Their rivals, the Homœopaths, professed to find in their proved remedies, particularly in the materia medica pura of Hahnemann, specific remedies for the phenomena of the typhoid state, for every stage of the disease. The most prominent drugs used by them were arsenicum, veratrum album, bryonia album, baptistia, belladonna, opium, rhus toxicodendron, etc., etc. Their course of treatment was passive

and Expectant, though they would not, probably, take that view of it. The cold wet pack was used by them also, at one time, in states of high temperature. Priessnitz, even with his heroic practice, would have shrugged his shoulders at this proceeding in the atonic state of typhoid: and the professional and trained hydropath would also have been shocked at it, and have characterized the practice as murderous. Nevertheless some recovered in spite of it.

The clinical thermometer came into use at this time. We have found no mention of that useful little instrument for following the therapeutic indications of malady in all history, except John Hunter's mention of it in a letter to Jenner, and the reference to it in Paris's "Life of Sir Humphry Davy," about the year 1800. Down to this period there had been no reference charts kept in the sick room, with the pulse rate, respiration, temperature, etc., for the guidance of the physician. Such memoranda as there were consisted of things noted and jotted down without order or method. There were no trained nurses except the male internes at the hospitals who had had no systematic training. There had never been training schools for nurses, male or female. Young men with hospital experience were sent out as occasion required. But the idea of a woman nursing a man, unless he were her husband, had never occurred to anyone. That was an evolution not yet reached. It was waiting the advent of Florence Nightingale.

As clinical aid, the thermometer was invaluable. Often in critical cases the pulse is misleading. It may be slow or infrequent with a high temperature; or it may be small and frequent with a low temperature. The two must be studied in conjunction to furnish a reliable guide, or to enable the physician to form a correct judgment in diagnosis or prognosis, or to discover the indications for medicaments. One wonders how the profession got on without it so long.

Small-pox prevailed at this time more in the New World than in the Old, spreading in the cold season and spring. The prejudice against vaccination had not died out, and the practice had not been made compulsory. The result was that large numbers of children in the public schools and other institutions had never been vaccinated. To embarrass the situation still more, the method of vaccination was imperfect. The vaccine was often of poor quality. The custom was still in vogue of vaccinating from arm to arm whole families, and of using for the purpose crusts of dried pus from a vaccine pustule. These were collected by dealers in vaccine virus and sold to physicians, sometimes at a great profit. It often happened, naturally, that the protective power of such vaccine was nil, or that it contained a virus of far different and a more toxic nature than the virus of cowpox. The mortality of the disease under such circumstances could not have been greatly modified.

Some new remedies for the disease were proposed and experimented with, but they were of doubtful efficacy, and gave place to others, and others. No specific had yet been discovered that would cut short the course and termination of the malady. The treatment was therefore on general principles, as in other diseases of its class, sanative and expectant, seeking "to obviate the tendency to death," as a learned Hippocratian of the period characterized the practice of medicine.[1]

[1] *Vide* Sir Thomas Watson's lectures on *The Practice of Medicine.*

SIXTH: PERIOD OF THE NINETEENTH CENTURY

(*SEVENTH DECADE*)

CHAPTER XVII

An Epoch in Etiology

THE seventh decade of the nineteenth century marks an epoch memorable in the progress of Medicine. The course of scientific development had revolutionized the philosophy of morbific causation and laid the foundation of Germ Pathology. It did not come suddenly; it was not revealed from Heaven: it was not the discovery of any single mind, or genius, but the work of plodders in the domain of little things; of men who had been busy for nearly a half-century with a new means of studying the secret of living things, normal and abnormal, in the life of man. We refer to the microscope. That instrument was not new to this decade, nor to this century; but new uses were found for it in the last and the last previous decade, which were heralded in this.

The celebrated Bichat, of the previous century, was the first to enter, about the year 1800, the field of minute anatomy. In his great work in four volumes on "Anatomy and Physiology as Applied to Medicine," which was published at that time,

he may be said to have established a new science, the science of Histology, from ἱστός, texture, and λόγος, descriptive. It comprehends the study of the minute anatomy of the tissues of the human body, their classification and properties. In 1831 de Mirbel applied and extended Bichat's studies to plants, and discovered, by the use of the microscope, that the tissues of plants were composed of utricles and cells. Schwann took up the researches of Bichat and de Mirbel and extended them to the microscopic elements of human tissues, as well as those of plants, and showed that in the ultimate analysis they were composed of cells. To him, therefore, must be credited the authorship of the cellular theory, and its application to all organic bodies, vegetal and animal alike. His great work was entitled "Microscopical Researches on the Conformity of Structure and of Growth of Animals and Plants" ("Mikroskopische Untersuchenem über die Überein Stirmung in der Struktur und dem Wadsthum die Thiere und Pflanzen." 1838).

The most celebrated ancient physicians and philosophers held very curious ideas of germination. Most of them were content to state the conditions under which it took place. Thus said Aristotle: "All dry bodies which become damp, and all damp bodies which are dried engender animal life." Aristotle, in the absence of knowledge of the cause of the phenomenon wisely contented himself with a statement of a fact. Others with

less wisdom and more imagination undertook to fathom the causes. The alchemist, van Helmont, declared that "the smells which rise from the bottom of morasses produce frogs, slugs, leeches, grasses and other things." His explanation of the origin of mice which we take this occasion to repeat is amusing. "It suffices," he said, "to press a dirty shirt into the orifice of a vessel containing a little corn. After about twenty-one days, the ferment proceeding from the dirty shirt, modified by the odor of the corn, effects the transformation of the corn into mice." He asserted that he had witnessed the fact. "The mice are born full grown," he declared. "There are both males and females. To reproduce the species it suffices to pair them." Van Helmont was a seventeenth century genius and a representative of a class of men who, when they are ignorant of the cause of a phenomenon invent one. The seventh decade of the nineteenth century was dominated by a far different class of minds, minds dissatisfied with deductions drawn from consciousness or subjective sources. They must have evidence of truth derived from the objective—from demonstration.

It is difficult to exaggerate the far-reaching importance of Schwann's demonstrations. "For as much," he says, "as the primary elementary forms of all organisms are cells, the fundamental force of all organisms reduces itself to the fundamental force of cells." M. Ch. Robin and others of his school, while not disputing the facts of the

fundamental cell, contested his interpretation and deductions. Twenty years later they were, in the main, universally accepted by men of science. In regard to the cellular theory, M. Letourneau, writing in 1870, observes:

> The observations and the inductions of palæontology, of embryology, or the systematic natural history of organized beings authorize us in considering the organic cell as the corner stone of the living world, the common mother of all other histological elements. In effect, the first figurative living beings have been monocellular, or composed of cells resembling each other, and simply juxtaposed. At the origin of nearly the whole of living beings, animals and plants, we find a simple cell. Finally, when we hierarchically class the innumerable organized beings which people our globe, we encounter at the lowest, the humblest degree, beings composed of a single cell, or a small number of identical and juxtaposed cells.[1]

We need not dwell at further length on this interesting subject, since it is an old one now and well known to the scholar in medicine. Its significance was not lost on that generation. Naturally it led to inquiries as to the origin of the cell, and a division of opinion into two parties, one holding to the theory of spontaneous generation, generatio equivoca, the other to epigenesis. The controversy on this subject was long continued and animated, each partisan claiming to have

[1] *Biology*, p. 33.

proved his contention by experimentation. The experiments of Tyndall in England in this decade would seem to have settled the problem against spontaneous generation and in favor of epigenesis, while the experiments of the celebrated Pasteur, at the same time, accomplished the same results in France, controverting and apparently disproving the views of the eminent naturalist and physiologist, M. Felix Archimede Pouchet, who deserves an introduction to the reader here.

Pouchet was born at Rouen in 1800 and devoted himself from his youth to natural science, in which he soon distinguished himself by his researches and versatility. In 1841 he published a work on "Natural History of the Animal Kingdom," in two volumes; in 1847 his work on "Theory of Spontaneous Ovulation and Fecundation of Mammifera" and in 1859 a "Treatise on Spontaneous Generation." In 1863 he returned to the last-named subject with the publication of new experiences on the same topic. M. Pouchet was distinguished by painstaking accuracy in his investigations, and apparent thoroughness of his researches into the profound mysteries of his subject. His last production was on the "Infinitely Little," in which he gives the results of his researches of the microscopic inhabitants of the atmosphere. They are more interesting to the Health Department of cities than to the general reader. Paris was an unusually clean city; nevertheless, M. Pouchet found the air in the better streets of that city swarming with

infusorial and bacterial life. They had their uses in the economy of God, but were out of place in the human circulation. In one cubic foot of air taken from a street of average cleanliness he found two million (2,000,000) bacteria; air taken from the slums contained myriads of these microscopic creatures. M. Pouchet's revelations of the conditions of the air of cities, densely populated sections, tenements, bedrooms, and other confined places, gave an impetus to the science of antisepsis and sanitation of homes, public buildings and resorts, and urban residences generally, and created a furore for out-of-door sleeping. M. Pouchet showed by this means that man, by imperfect sanitation, personal, and in his habitations, was in large measure the source of his own infection. Not only did he throw off infection, but he ingenerated and absorbed it, with the effect of self-infection, *autotoxæmia*—and himself increased his mortality and that of those about him. As might naturally be supposed, M. Pouchet found that the air of the country, the wood, the farm, and fields contained much less of bacteria, for which reason such habitations were more wholesome than city life, even though the habits of farming and peasant class were less sanitary than the urban classes.

Nor was this all. The discovery demonstrated the danger of infection from the air we breathe every moment of our lives, under the best sanitary conditions that are practicable. Nature, kind

mother that she is, knew this peril from the beginning, and safeguarded the economy against bacterial intrusion by placing sentinels at every ingress to the body. Yet they are inadequate for the purpose as the prevalence of infectious fevers and inflammations from such causes shows.

Louis Pasteur and Immune Medicine

A greater celebrity than M. Pouchet was Louis Pasteur, whose distinguished services to medical science merit a place here. M. Pasteur was born at Dole, in 1822. M. Pouchet was at the height of his renown when M. Pasteur reached his majority. Both were scientists by taste and profession, and the elder of them must have been an excellent example to the younger, since he, too, among other things, was interested in the infinitely little. M. Pasteur early showed a genius for research into forces dynamic, and devoted himself at first to Molecular Chemistry; later, he became interested in germ-life and in generation, and was led to controvert the views of M. Pouchet on that subject, holding to the doctrine of Epigenesis as opposed to Generatio Equivoca, or spontaneous generation. M. Pasteur's demonstrations on the subject are of the profoundest interest. They seem to have put the matter at rest; yet there are scientists who still nurse their doubts as to which hypothesis is true, or most deserving of credence. Even the late

Louis Pasteur.

From a photograph. Kindness of Mlle. Laflin.

Rudolph Virchow, in 1877, expressed himself as in doubt as to which hypothesis to believe, since neither hypothesis had at that time advanced to the stage of what he termed objective knowledge—to which kind of knowledge he preferred to confine himself.

A brief account of the conflict between these great men, both expert investigators, on the subject of generation, may not be without interest. M. Pouchet claimed that he had performed an experiment which demonstrated the fact of spontaneous generation beyond doubt or conjecture. M. Pouchet stated the problem with precision:

> The opponents of spontaneous generation assert that the germs of microscopic organisms exist in the air which transports them to a distance. What, then, will these opponents say if I succeed in inducing the generation of living organisms, while substituting artificial air for that of the atmosphere?

M. Pouchet then described this ingenious experiment: He filled a bottle with boiling water, hermetically sealed it with the greatest care and plunged it upside down into a basin of mercury. When the water was quite cold he uncorked the water under the metal, and introduced into it half a litre of pure oxygen gas, which is as necessary to the life of the smallest microscopic organism as it is to that of the larger animals and vegetables. Up to this time there was nothing in the vessel

but pure water and oxygen. Pouchet then introduced a minute bunch of hay which had been enclosed in a corked bottle, and exposed in a stove for a long time to a temperature of 100 degrees, centigrade. At the end of eight days a mouldiness was developed in this infusion of hay. Where does this come from? cried M. Pouchet, triumphantly. Certainly not from the oxygen, which had been prepared from a chemical compound at the temperature of incandescence. The water had been equally deprived of germs, since at the boiling temperature all germs would have been destroyed. The hay also could not have contained them, for it had been taken from a stove treated to 100 degrees centigrade. As it was urged, however, that certain organisms could resist this temperature, M. Pouchet heated the hay from 200 to 300 degrees, or to any temperature that might be desired.[1]

M. Pouchet certainly seemed to have proved his hypothesis of spontaneous generation, for from whence could have come the mould in the hay infusion? At this juncture M. Pasteur appears upon the scene. "In a lecture which he gave at the Sorbonne in 1864, before a large audience composed of savants, philosophers, priests," and other distinguished gentlemen, M. Pasteur thus described and criticized the experiment of M. Pouchet:

This experiment is irreproachable, but irreproach-

[1] *Life of M. Pasteur*, M. Metchnikoff.

able only on those points which have attracted the attention of its author. I will demonstrate before you that there is a cause of error which M. Pouchet has not perceived, which he has not in the least expected, which no one before him suspected, but which renders his experiment as completely illusory as that of van Helmont's pot of dirty linen. I will show you where the mice got in. I will prove to you, in short, that it is the mercury which carried the germs into the vessels, or rather, not to go beyond the demonstrable fact, the dust which is suspended in the air.

M. Pouchet's experiment was indeed irreproachable; he had guarded every point against the intrusion of air to the bottle, but had overlooked to guard against dust with which the atmosphere is charged, much of which is bacteria. "Yes," exclaimed M. Pasteur, with a voice which gave evidence of the sincerity of his conviction; "yes, M. Pouchet had removed the germs from the water and from the hay, but he had neglected to remove the dust from the surface of the mercury." This was a fatal error. It vitiated his experiment.

M. Pasteur then proceeded to correct the error into which his colleague had fallen. He repeated the experiment of M. Pouchet in every particular, but "took care to remove every cause of error which had escaped the latter. He employed a glass bulb with a long neck, which he bent and connected with a tube of platinum placed in a furnace, so that it could be heated nearly to

redness. In the bulb he placed some putrescible liquids—urine for example. When the furnace which surrounded the platinum tube was in action, M. Pasteur boiled the liquid for some minutes; then he allowed it to cool, keeping the fire around the platinum still active. During the cooling of the bulb the external air was introduced, after first travelling through the red hot tube of platinum. The liquid was thus placed in contact with air whose suspended germs were all burnt up." This liquid, it is needless to say, could be kept in such a position for an indefinite period without generating a single organism. Not satisfied with his demonstration, he proceeded to remove from the experiment every possible source of error. It might be urged by the skeptic that the dust in the experiment of M. Pouchet might not have contained germs. There was no proof of their subsistence in the dust on the surface of the mercury.

Through a tube stopped with cotton wool M. Pasteur, to perfect his experiment by means of an aspirator, drew ordinary air. In passing through the wool it was filtered, depositing therein all its dust. Taking a watch glass, he placed upon it a little water in which he steeped the cotton wool stopper and squeezed out of it, upon a glass slide, a drop of water which contained a portion of the intercepted dust. He repeated this process until he had extracted from the cotton nearly all the intercepted dust. Placing the glass slide with a little of the soiled liquid

under a microscope, particles of soot, fragments of silk, scraps of wool or of cotton could be easily distinguished. But in the midst of this inanimate dust [continues the narrator] living particles made their appearance—that is to say, organisms belonging to the animal or vegetable kingdom, eggs of infusoria and spores of cryptograms; germs, animalculæ, flakes of mildew floating in the atmosphere, ready to fall into any appropriate medium, and to develop themselves at a prodigious rate.

A skeptic, sensitive to every possible source of error, might be able to detect it in this last experiment of M. Pasteur. No one could be more sensible of this than the author. May there not be some unknown force, some occult power operative here which escapes finite perception? May there not be a subtle magnetism, an electric force, an ozone or a radium, all possessing powers not detectable by the microscope or chemical magnets, able to evolve life under unknown circumstances? "Fearing that determined skepticism might still attribute to the cotton wool stopper in the foregoing experiment an influence of some sort on account of its being an organized substance, Pasteur substituted for the stoppers of cotton wool, stoppers of asbestos, previously heated to redness. The result was the same."

M. Pasteur continued these investigations for many years, with a patience and persistency born of a pure, disinterested love of the truth, devising new methods of research and new experiments,

as objection after objection was raised to throw doubt upon the demonstrable character of his experiments, all with the same result, showing that germinal matter, living organisms, are freely mingled with dust in the atmosphere and are the source of infection. Exclude these from the air, or kill them by spraying the air with fluids inimical to them, the infectious property of the air is prevented. There is nothing left in it to germinate.

As a final effort to convince the most skeptical of the truth of his deductions, M. Pasteur showed one of the glass bulbs filled with water, with the sinuous neck, which he had prepared in the course of previous experiments, and kept for months and years. The bulb was covered with dust. "Let us," said he, "take up a little of this outside dust on a bit of glass, porcelain or platinum, and introduce it into the liquid; the following day you will find that the infusion, which up to this time remained perfectly clear, has become turbid, and that it behaves in the same manner as other infusions in contact with ordinary air."[1] It has supplied a nidus for the multiplication of atmospheric germs, prevalent in its air.

Notwithstanding the unique experiments and demonstrations of Pasteur, many men of science maintained the doctrine of generatio spontanea, (spontaneous generation), in conformity to the

[1] This brief account of Pasteur's early labors is slightly paraphrased from his *Life and Labors*, written by his son-in-law, M. Metchnikoff.

book of Genesis. It had its strong supporters in France, Germany, and America at this period. M. Pouchet was not converted by the demonstrations of Tyndall and Pasteur, but died firm in his belief of generatio spontanea. M. Letourneau in his fine volume on "Biology," although writing in a spirit free from partisanship, favors the doctrine. Haeckel and Virchow were not convinced by the demonstrations of Pasteur. M. Letourneau permits himself to say in its favor that "the doctrine of spontaneous generation does not merit the vulgar disdain with which it is assailed. Its partisans are able to rely on serious arguments drawn from observation and experiment. It is evidently not enough to oppose to them dogmatic contradictions and some questionable chemical experiments."[1]

M. Pasteur was fixed in his belief that living organism came into being with parents, never without. His final word on the subject was: "Spontaneous generation is a chimera." In this opinion he had the support of the Paris Academy of Sciences. Its permanent secretary, the eminent physiologist, M. Flourens, declared before the whole Academy that:

As long as my opinion was not formed, I had nothing to say; now it is formed and I can speak. The experiments are decisive. If spontaneous generation be a fact, what is necessary for the production of animalculæ? Air and putrescible liquids. Now,

[1] *Biology*, p. 307.

M. Pasteur puts together air and putrescible liquids and nothing is produced. Spontaneous generation, then, has no existence. Those who still doubt have failed to grasp the question.[1]

The discerning reader will have discovered that the truth or fallacy of generatio spontanea does not affect the truth nor the significance of the subsistence of living organisms, in multitudes which no man can number, inimical to the life of man and other warm-blooded animals, when they gain entrance into the blood. This is the revolutionary fact in modern pathology; the revolutionary fact in modern practice. It is so completely revolutionary in the practice of medicine that the profession is slow to comprehend it, and slower still to adapt their therapeutics to it. Nearly half a century has lapsed since the fact was proved, but therapeutics is yet but slightly modified by it. Surgery, however, is an exception. The genius of Lister seized upon the discovery, in 1861, and applied it to operative procedures, with results which at once revolutionized the art of surgery, and created what had hitherto been only an art into a grand and most beneficent science.

Before proceeding further with the bearings of these discoveries upon therapeutics, we shall allow ourselves to be deflected for a moment to consider their influence upon Pathology. The study of this branch of Medicine had been prose-

[1] *Vide* Metchnikoff's *Life of Pasteur*, p. 109.

cuted with commendable zeal ever since the beginning of this century. It had been given an increased impetus by Oken, an Austrian, Schwann of Germany, and M. Bichat and others of the French School. The splendid labors of these great men prepared the way for Rudolph Virchow, whose great work on "Cellular Pathology" appeared in the sixth decade. Virchow was born at Köslin, in Pomerania, in 1821. He applied himself to medicine, after receiving an elementary education, and became Prosecutor at Berlin in 1846, and in 1856 was made Professor of Pathological Anatomy at the Berlin University, with which he was connected until his death in 1903.

Virchow was a great teacher, a man open to new ideas, of liberal, independent views in medicine, religion, and politics. He was for many years a member of the Reichstag, and always a leader of men. His publication of a work on "Cellular Pathology," in 1859, at once distinguished him. In this work he did for pathology what Schwann a few years before did for physiology. While Schwann had studied the minute anatomy of healthy tissues and reduced them to the fundamental cell, Virchow studied the minute anatomy of diseased tissues, tracing them to their primary cell, and showing their deviation from the normal state. This process might properly be called "Microscopic Pathology." It was really the first systematic attempt to trace the pathogenic changes in cell-life under the influence of morbific

causation and to unfold the significance of such changes.

As a public man of strong convictions and ultramontane views of the primacy of both State and Church, it is not difficult to understand the embarrassment under which Professor Virchow prosecuted his labors in science and philosophy. In his memorable address on "The Freedom of Science in the Modern State," before the German Association of Naturalists at Münich in 1877, Virchow referred with sympathetic feeling to the fact that thirty-nine years before they had met in secret and in darkness, and prudently concealed the names of their members until 1861, lest they might suffer for words spoken in their discussions. And he referred with pathos to the fate of his brother naturalist, the distinguished Oken, who, owing to his advanced philosophical opinions, was relieved of his Chair in the University of Jena, and had to seek a position in the freer atmosphere of Zurich. It was then an offence not to be tolerated in a teacher, to express the belief that "all organic beings originate from, and consist of cells or vesicles."

In the address to which we have referred, Professor Virchow expressed embarrassment that there should be so great a difference between what he believed and what he knew. It was clearer to him *what he did not know than what he knew.* It had been a struggle all his life, he said, to keep them distinct and separate. We should

teach, he declared, only what we know, and we do not know what we cannot demonstrate. This proposition may fairly be questioned. He designated the two modes of thought, subjective and objective. The subjective thought, or what he believed, he has tried to hold in abeyance, and to confine his dissertations wholly to the objective. "Every year," he observed, "I am continually seeing afresh that I am myself, on the very points where I thought I had become entirely objective, still retaining a large portion of subjective ideas."[1]

The learned author spoke from personal experience. But is his complaint just and wise? It may be, at least, wise of a man placed in a position where for peace' sake he must weigh his words as to their effect upon vested interests, politically, commercially, and ecclesiastically; but it is a position most humiliating to a freeman to hold. The subjective side of one's nature has a right to be heard. Emerson declared that the heart had sources of information as well as the head. All know how true that is. If one were to teach only what he knew, his teaching would be poor indeed. Every man has a vast storehouse of well-conceived ideas to which he is rarely able to give full utterance. Language for the purpose fails him. The difference between men of mediocrity and men of ability does not consist in difference of knowledge so much as difference of conception and their powers of utterance.

[1] *Address*, etc., p. 50.

What a man believes is entitled to be heard. It may contain germs of truth which the hearer shall be able to thresh out for himself. If we are to confine ourselves to the objective, that is to the demonstrable, we shall greatly curtail the limitations of our ideas, the exercise of our reasoning powers, and dwarf our highest intellectual function—imagination. Positive knowledge would be the loser in the end.

Professor Virchow would throw psyché out of the window because he could not prove its existence. For a like reason, would he throw himself out of the window? He did not recognize, apparently, that he possessed the proof of its existence in his consciousness. Is not Descartes' epigram, "I think, therefore I am," a demonstration of the fact? Some persons possess intuitions so clear and strong as to amount to knowing, if not to demonstration. One does not need proof of what he knows. Discoveries in science and philosophy possess this characteristic; Newton had it, and it inspired him to persevere in his optical studies; Galileo had it, and it compelled him to persist in his belief that the earth was globular and turned on its axis every twenty-four hours; Roger Bacon was endowed with it, which forced him to assert the same hypothesis, and many others that have since become demonstrable facts. Pouchet believed in the subsistence of invisible organisms in the air long before he looked for them. But for in-

timations of truth, we would never seek for them—and therefore never find them. We feel strongly impelled, therefore, to assert that but for subjective ideas science and discovery would come to a standstill. Nevertheless, let what one knows and what one believes be kept separate.

The Rise of Isopathy

In Medicine, the subject paramount to all others at this period was not spontaneous generation or otherwise, but the etiology and therapeutics of contagious diseases, or contagio animato. The man who did more to settle the problem of epidemics in man and animal, and to discover remedies therefor, than all previous investigators had done, passed from earth some years since. The achievements of M. Pasteur far transcend in wonder the stories of "Wonderland," or the "Arabian Nights." When one reads the simple narrative, free from self-glorification, pride, or egotism, or thought of profit, fame, or power, without envy or emulation of others, with a purpose animated solely by a supreme love of truth and to be of service to mankind, one feels like parodying the words of the Psalmist in addressing Almighty God: How great is Man of whom Thou hast been eternally mindful!

We have to forego the delightful task of following M. Pasteur through the grand epochs in his eventful career. We have not space to do so,

nor would it be in line with our purpose. We can only give a passing notice of his most notable achievements.

M. Pasteur was, at the outset of his career in science, attracted by the phenomenon of fermentation. Professor Liebig, the illustrious German, was in his zenith at that time, and an oracle in chemistry. He had committed himself to the idea that fermentation was a purely chemical process, dependent upon oxygen,—was oxygenation, in fact. M. Pasteur conceived that it was a vital process, dependent on living organisms, microscopic, in the air. He therefore set himself to prove it by studying the phenomena of yeast, wine, and beer, and other phenomena dependable upon a ferment. Ere long he was able to controvert the old chemist Liebig, and conclusively to show that the "ferment" was due to the action of living germs that subsist in the air; that if the air be admitted to an infusion, deprived of its oxygen, fermentation will occur at a proper temperature just the same. Professor Liebig warmly contested this demonstration, but finally yielded his assent to it.

When the silk worm industry was threatened with destruction, about this period, in France and elsewhere, and manufacturers of silk were losing millions annually by the destruction of the silk worms, the services of M. Pasteur were employed to ascertain the cause, and to find a remedy. Many microscopists had previously

exhausted their resources in the same direction. He was loath to undertake the task, having suffered a partial paralysis. All Southern Europe was crying for help in behalf of their chief industry, and finally he essayed the undertaking. Ere long he discovered the secret. It was a parasite, requiring a microscope of the highest power to detect, that had invaded the leaves of the mulberry trees on which the worms had fed. This little organism which the worms had consumed was in their turn consuming them. The cure was first to get a supply of healthy, uninfected worms, and then to supply them with leaves that had been treated antiseptically. The cure was complete and the silk industry was soon restored.

Again, when a plague broke out in France among chickens, known as "chicken cholera," which was destroying the chicken industry of that country,—a very important industry in France,—M. Pasteur was appealed to for help, and with his usual acumen, discovered the offending microbe that was preying on the chickens, and prescribed an effective germicide against it. The malady was splenic fever.

At the same time the farmers of France were in despair over a plague that was fast depleting their flocks and herds. A deadly fever, since called splenic fever, raged among them, with great virulence. The causation of the malady was unknown, and accordingly remedies had been of

no avail. In this extremity the services of M. Pasteur were invoked. The sequel was among the most interesting of any in this great celebrity's career. It was a long story and one of great labor, with the result to establish the cause of the plague and to banish it from France.

A few details here may not be uninteresting. Pasteur's first move was to secure some of the splenic fever virus. With this he produced, after a series of experiments, by the aid of a neutralized chicken broth, repeated cultures of the virus, until he obtained one of the degree of virulence efficient for the object in view. At last he was successful. It was thus that he pitted the attenuated virus which had caused the plague against the more virulent one. Like Lesage, he set the demons in the virus fighting against the demons in the blood. It was in 1881 that he communicated his discovery to the Academy of Sciences, amid shouts of applause. Soon as the news reached the public M. Pasteur was waited upon by the president of the Agricultural Society of Melun, and begged in the name of the Society that he would make "a public experiment of splenic fever vaccination." To make a long story short, the Society placed at M. Pasteur's disposal sixty sheep. "Ten of these sheep were not to receive any treatment; twenty-five were to be subjected to two vaccine innoculations at intervals of from twelve to fifteen days, by two vaccines of unequal strength. Some days later,

these twenty-five sheep, as well as the remaining twenty-five, were to be innoculated with the pure virus of virulent splenic fever. A similar experiment was to be made with ten cows. Six were to be vaccinated, four not vaccinated; and the ten cows were afterwards, on the same day as the fifty sheep, to receive innoculation from a very virulent virus." Then M. Pasteur made the following prediction:

That the twenty-five sheep which had not been vaccinated, would perish, while the twenty-five vaccinated ones would resist the very virulent virus; that the six vaccinated cows would not take the disease, while the four which had not been vaccinated even if they did not die, would at least be very ill.

On the day appointed, when the arrangements were all made and the time had come when the effects of the vaccinations were due, a large assemblage of distinguished gentlemen met at the farm to witness the results. On their arrival,

Out of twenty-five sheep which had not been vaccinated, twenty-one were dead; two other sheep were dying, and the last, already smitten, was certain to die that very evening. The non-vaccinated cows had all voluminous swellings at the point of innoculation, behind the shoulder. The fever was intense, and they had no longer strength to eat. The vaccinated sheep were in full health and gaiety. The vaccinated cows showed no tumor; they had not even suffered an elevated temperature, and they continued to eat quietly.

These experiments were conclusive to the minds of the most skeptical present, among whom were several veterinary surgeons, and M. Pasteur was the hero of the occasion. Another demonstration had been made of germ therapeia. A splendid triumph had been achieved for the new therapeutics—Aseptic Therapeutics!

It remains to be said on this occasion that, "an extraordinary movement was everywhere produced in favor of vaccination of animals against the plague. A great number of Agricultural Societies wished to repeat the experiment at Pouilly-le-Fort. The herders of cattle overwhelmed Pasteur with applications for vaccine. To meet the demand, M. Pasteur was obliged to start a small manufactory for the preparation of these vaccines in the Rue Vaugrulin, a few paces from his laboratory. At the end of the year 1881, he had already vaccinated 33,946 animals. This number was composed of 32,550 sheep, 1254 oxen, and 142 horses. In 1882, the number of animals vaccinated amounted to 339,102 which included 47,000 oxen and 2000 horses. In 1883, 100,000 animals were added to the total of 1882.[1]

It should be observed that immunity from the disease thus secured was not certainly permanent for more than a year. The duration of immunity

[1] Condensed from Élie Metchnikoff's *Life of Pasteur*. The mortality of splenic fever had practically disappeared from France.

from vaccination for small-pox does not exceed ten years—in many persons not so long a period.

These brilliant demonstrations of M. Pasteur had been made in a rude, inexpensive laboratory and carried on mainly at his own expense. The City of Paris was too poor to grant him an appropriation! But now the treasury of the municipality was wide open to him. The old garden of the ancient College Rollin was placed at his disposal, and he proceeded to make apartments for animals of every species that were liable to infectious diseases, or that might be useful to him as subjects of experimentation, or for the purpose of making cultures of the various viruses that he had use for. It was truly a place of horrors to visit, at least for the uninitiated, and not to be described here. The anti-vivisectionist would have found much there upon which to nourish his sentiments. Yet, be it remembered, it was conducted by one of the mildest and most humane men that the world has known. A story is told of him that in the presence of a large assembly of spectators, he had occasion to asphyxiate a swallow in a bell glass. When the audience exhibited their sympathy in exclamations of pity, M. Pasteur turned to them and said: "I never had the courage to kill a bird in sport, but when it is a question of experiment, I am deterred by no scruple. Science has the right to assert the sovereignty of its aims."

At this stage of M. Pasteur's career, which he felt

was nearing its close, and that he must improve almost every moment of his time, he seemed to be oblivious of everything but the establishment of his germ theory of certain diseases. He lost no opportunity to make an experiment, or to establish a point. In May, 1879, a person who was working in the laboratory was troubled with boils, which reappeared, as usually happens, at short intervals, sometimes on one part of the body, sometimes on another. Pasteur, whose mind was continually dwelling on the part played by microscopic organisms, asked himself if the pus of the boil did not contain a parasite, the presence and development of which, and its accidental transport here and there in the body, might be the cause of the local inflammation and the formation of the pus. The constant reappearance of the evil would be thus accounted for. In this case the pus of the first boil, which was situated on the nape of the neck, was collected in great purity; some days afterwards, the pus of the second boil, then of the third boil, was collected. The pus or the blood-stained lymph of the red swelling, which preceded the formation of the pus, was sown in a sterilized infusion, and each time a microbe, formed of little spheroidal points connected in pairs frequently united in small clusters, was seen to develop itself. The cultivating liquid was sometimes infusion of fowl, sometimes of yeast. In the infusion of yeast the little grains were suspended in pairs through-

out the liquid, which was uniformly thickened with them. In the fowl infusion the grains were united into little clusters, which covered the sides of the vessel, the liquid remaining clear as long as it was not shaken.[1]

Suffice it to say that the study of boils, of which the above was the beginning, was continued with ever increasing interest, and always with the same results, all pointing to the same conclusion as to the morbific causation of pus-forming affections, mild and harmless, or severe and perilous—as in the graver forms of abscesses, anthrax, etc. Making cultures from the microbes thus obtained, he produced similar processes on the healthy subject and cured him by the same means, thereby again demonstrating their specific properties and the truth of his great discovery. So precise and thorough was he as to details in his experiments, so careful in guarding against possible sources of error in his demonstrations, that the most skeptical,—even the celebrated Koch, of tuberculin fame,—were finally convinced, and manfully yielded assent to Pasteur's demonstrations with all their significance.

One of M. Pasteur's latest discoveries was the etiology of rabies. This is one of his least important achievements, and yet is the one by which he is best known at home and abroad. The Pasteur Institute at Paris has a wide reputa-

[1] *Op. cit.*, p. 276.

tion, and similar institutions have sprung into existence in many populous cities in both hemispheres, chiefly for the treatment of hydrophobia by the Pasteur method, which differs in no essential particular from that in the treatment of anthrax, or splenic fever, either in animal or man. The remedy consists of cultures made from the rabic microbe, obtained from the saliva of a rabid dog, attenuated to such a degree as experience has found to be the most efficient. We owe it to M. Pasteur to have set at rest the controversy as to the existence of hydrophobia, which has been waged so long; to have demonstrated its microbic origin and infectious character; and to have produced a safe and certain specific against its fatality in all cases when the use of the remedy is not too long delayed.

Moreover, M. Pasteur's investigations as to the prevalence and dangers to life and health of bacteria in food and drink, and the air of close, ill-ventilated, unsunned, and foul habitations have had a most salutary effect in awakening public and professional interest in hygiene. He devoted much attention to the milk supply in cities, and made clear the polluted character of much that is supplied to families; its peril to young children, especially, and devised a method of making it, if not pure, at least of rendering it innocuous. To this process has been given the term Pasteurize, as Pasteurized milk. To

M. Pasteur, more than to any other man, must be accredited the introduction of sanitary methods in the preparation and manufacture of the multitude of food products, which enterprising men have sent broadcast to every part of the world. To him more than to any other man must be given the credit of awakening the profession to the importance of sanitation of the sick room, and of the hospital, especially of the operating room and instruments, the sanitation of the subject to be operated upon, and of the operator and his assistants and nurses. Lister may have introduced antiseptic surgery, the honor and distinction of which he is accorded; but it was Pasteur and his coadjutors that showed the advantages to be derived from it, aroused the surgeon's attention to the subject, and prescribed the means to make its introduction practicable. But above and beyond all that, to M. Pasteur belongs the distinction of discovering the germ theory of infectious disease, and to remove it from the domain of hypothesis; likewise of introducing aseptic therapeutics in the treatment of all the more fatal maladies that affect the race of man. His discoveries have marked an epoch in the progress of medicine by promoting physical diagnosis, the result of which is revolutionary.

The learned Virchow more than intimated in the address at Münich in 1877, to which we have referred, that the discoveries of M. Pasteur would bring to an end the career of Hippocratic dogmatic

medicine.[1] The medical art, according to Hippocrates, consists in doing the right thing at the right time according to one's light. Nature does the rest. He did not dogmatize as to dosage or choice of a medicament, with due respect for the distinguished savant, be it said.

The discoveries of M. Pasteur will not abrogate Hippocratic medicine. They should not be regarded as destructive but as developing. Systems may dissolve and pass, but no truth ever suffers by new discovery. The theory of Hippocratian medicine, the foundations upon which the system of Hippocrates was built, are as lasting as the hills—as enduring as malady. The errors which have grown like fungus about it, by the misconceptions of that sage's followers, and become a part of its organism, must crumble and fall away in the blaze of Pasteur's discoveries, which have added so much to the knowledge of the etiology of morbific causation, and at the same time increased the certainties of medical treatment—Therapeia. Nothing more.

The dogmatic in medicine is a feature of comparative modern growth. The disciples of Hippocrates, following the death of that sage, at the head of which was his son-in-law and successor, Polybius, by reason of adhering closely to the

[1] Professor Virchow's words, as translated and revised in proof by himself, were as follows:

"Thirty years ago the Hippocratic method was still spoken of as a thing so exalted and important, that nothing could be imagined more sacred. To-day it may be said that this method

practice of the master, were termed Dogmatists; but the sect, with the advent of Galen, who was an Eclectic in practice, was succeeded by that of Methodists, so called by being methodical in practice, led by Themison. On the revival of learning there was naturally a variety of medical sects, the most prominent of which was the Eclectic; but the rivalry with each other was not attended with the personal animosity that was so prominent at the beginning of the present century. At this time, the Hippocratic element had grown rich and influential; it had control of the universities and hospitals, and dictated medical policy and method of practice which they assumed to be Hippocratic, and denounced as irregular, if not quacks, such as differed from them. All this was quite natural and in accord with the instincts of human nature, on its present plane of development, if not to human reason; but they had no authority in the precepts of the sage of Cos for the proceeding, no more than had Calvin for his proceedings at Geneva, in the precepts of the divine Nazarene—or the Roman Hierarchy, or Luther, or Wesley, or Knox, had for the exercise of dogmatism.

is all but annihilated to its very roots. At least there would be considerable exaggeration in saying that a clinical physician of the present day still proceeds like Hippocrates. Yes, when we compare the medical practice of to-day—for it so happens that the year 1800 forms a great turning point in medicine,—we find that our science has been completely transformed in the course of seventy years."

It would seem from these truths of history, therefore, that the learned Virchow was in error in characterizing dogmatic medicine as Hippocratian. In the precepts and practice of Hippocrates there was no reason or justification for schisms or sects in Medicine. They were broad and liberal enough for every phase of medical opinion and method of medical practice. While he laid a foundation for all time, the superstructure was subject to modifications according to advancing light. It was in the narrow and proscriptive element that sects in medicine took their rise. But for that the latter would have had no raison d'être.

The illustrious Frenchman's discoveries and demonstrations were revolutionary of the art of medicine. It seems to us that no Hippocratian mindful of his proper function in the care of the sick can regret this. The master insisted that the medical art consisted in doing the right thing at the right time; in following the indications. To this end it was incumbent upon him to use all the means and measures within the scope of his knowledge to promote convalescence. We repeat that the Hippocratian came at the call of malady; he will not pass until malady ceases to exist.

The investigations and demonstrations of M. Pasteur, although original with him and to modern times, were not new as a historic fact. What may be termed Immune Medicine was practised by the aboriginal inhabitants of America from an

early date. In their pastime, called the "Snake Dance," for example, they handled venomous reptiles in all manner of ways with impunity, although frequently bitten by them. The virus or venom of the young snake was less virulent than that of the snake when mature, and their bite, though poisonous, was not fatally so. Being frequently bitten by them their virus finally ceased to have any effect; they became immune to their venom, and finally to that of older snakes likewise.[1]

Travellers in East Africa have observed similar facts among savages there. The "Snake Dance" is a favorite amusement among them in celebrating fête days and triumphs in their wars and exploits. They toy on these occasions with reptiles the most venomous, but they take the precaution first to become immune from the poison of their bites, by subjecting themselves to the bites of the young snake, whose venom is feeble and the effects of which soon subside. In that way they become innocuous to the virus of the mature snake, and receive their venomous bites with impunity, as has been said.

The practice of immune medicine, classically termed Isopathy, from ἴσος equal, and παθος disease, was known to the ancient Franks,[2] and consisted of using the products of a disease as a remedy to cure it. The practice of isopathy was predicated on the abstract hypothesis that every

[1] *Vide* McCulloch's *Work on he North American Indians.*

[2] *Vide* Dunglison's *Therapeutics and Materia Medica.*

disease contained in itself the means of its cure. In this, as in most hypotheses, there was a grain of truth, but as an abstract proposition it was fanciful and dropped out of sight. In the germ theory of disease, the hypothesis was proved by Pasteur to be true as to certain of the contagious diseases, and later investigators have found that it is equally true of certain other of the contagious or infectious diseases. The practice would seem to be confined to that class of maladies.

A few words in regard to the modus operandi of vaccines, or isopathic remedies: In what way does the attenuated virus render the blood immune from attacks of the pure undiluted virus? The answer to that question must be subjective; it is not provable; but in the absence of positive knowledge, the theory advanced by Professor Tyndall has an element of plausibility. It is, in brief, that if the administrations of the attenuated virus be in doses of an amount sufficient to destroy the material in the blood that the germs of the virus feed and multiply upon, without producing in the subject poisonous effects, the blood becomes immune to the virus, and its germs cease to multiply by reason of not finding nourishment in the blood. In other words, they die of starvation in the system, and Nature disposes of them as she does other peccant matters.

Contagia are living things [says Professor Tyndall] which demand certain elements of life just as in-

exorably as trees, or wheat, or barley; and it is not difficult to see that a crop of a given parasite may so far use up a constituent in small quantities in the body, but essential to the growth of the parasite, as to render the body unfit for the production of a second crop. The soil is exhausted, and until the lost constituent is restored, the body is protected from any further attack of the same disorder. . . . To exhaust a soil, however, a parasite less vigorous and destructive than the really violent one may suffice; and if after having by means of a feebler organism exhausted the soil, without fatal results, the most highly virulent parasite be introduced into the system, it will prove powerless. This, in the language of the germ theory is the whole secret of vaccination.[1]

[1] Tyndall's *Introduction to the Life and Labors of Louis Pasteur.*

SIXTH: PERIOD OF THE NINETEENTH CENTURY

(*SEVENTH DECADE—Continued*)

CHAPTER XVIII

RISE OF ASEPTIC SURGERY

APART from the discovery of the germ theory of contagious diseases and of Immune Medication, the demonstration by M. Pouchet and his confrères that the atmosphere was populated by myriads of micro-organisms that prey upon human life and health, was the most momentous achievement in medicine of modern times. It could not otherwise than have had an influence upon medical practice of far-reaching importance. Prophylaxis and germicides had now become the order of the day, and the wisdom of the old saying that an ounce of prevention is worth a pound of cure, began to be recognized. The ancient goddess, Hygeia, who played so conspicuous a part in epidemics in the pagan world, was brought forth and again enthroned. Boards of health and public hygiene acquired new powers and the scope of their activities was greatly enlarged. It was as if a new deduction of the

philosophy of life had dawned upon the mind of man, in contemplating these discoveries, namely, that in the creation of the world he was not the sole purpose of the Creator. Man may have been His ultimate purpose, but it had become obvious that myriads of other beings had taken possession of the earth and held it as by pre-emption; and that man's position here was that of an intruder. If, therefore, he were to possess the earth and acquire exclusive dominion, he must fight for it, nor complain if he were occasionally worsted in the contest. The world is his only by right of might, by conquest, by exterminating the vast hordes of morbific causes, or utilizing them for benign purposes.

The more immediate effect of these discoveries was upon surgery. Surgery only needed now a safe and effective germicide to have before it a free and open course. That was found at first in carbolic acid, and later in the marvellous polychrest of the materia medica, mercury—the salt, mercuric bichloride, diluted from one thousand to ten thousand times. The discovery of other germicides soon followed, and other antiseptic preparations in great numbers. It marked the beginning of a new era in surgery and sanitation.

We have dwelt at some length in a previous chapter on the progress of the art of surgery,—it had not become a science during the first half of the nineteenth century; but it was cultivated and promoted by learned and brilliant men under

trying and painful difficulties. It was late in the fifth decade when anæsthesia was discovered, and a decade later before it was in general use. Deaths were reported not infrequently from its use and physicians were afraid of it. Prior to its general introduction, the terrors of a surgical operation may be better imagined than described. The older members of the profession well remember in their student days the scenes of the surgical clinic: the unearthly groans, the struggles, the howling and shrieking of the victim under the knife, while two or more stout assistants held him tightly in their grasp upon the operating table. Only the hardier and less sympathetic students could endure it; faintings were of frequent occurrence among the more sensitive and sympathetic. These scenes made it harder for the operator, and were a source of embarrassment to him in undertaking the more delicate or serious operations; indeed, the agony attendant upon such operations deterred many patients from submitting to them, preferring to die rather.

But that was not the worst part of hospital conditions. In the decade previous to the one of which we are writing, to send a patient to a hospital was regarded by him as paramount to a sentence of death. A horror of the hospital had been inbred in the common mind by long and sad experiences, and perpetuated from father to son, creating a prejudice against it which is not yet outgrown. Within living memory it

was a place of infection. The stench of a consumptive ward was most sickening. There were such diseases as hospital gangrene, hospital fever, surgical sepsis, erysipelas, pyæmia, septicæmia, etc. What is known as "secondary hemorrhage" was common after operations. The internes of the hospital wore the same clothes from one week end to another and one case to another. The surgeon himself did not put on clean linen before operating, nor change his ordinary wearing apparel, nor clean his finger nails. It was a common saying after a serious operation, "If erysipelas does not set in, the patient will recover"; in modern parlance, if blood-poison does not set in the patient will recover.

Moreover, in the towns and suburban districts, the surgeon was hampered by want of proper means; his instruments were of the crudest sort, often rusty and untidy, or cleansed with ordinary soap and water; his assistant, generally a green boy or farm hand; splints, if the case were a fracture, he had to improvise on the spot with a jack-knife and hatchet. There was no absorbent cotton; no antiseptic gauze; no surgical plaster; and as for bandages he had to tear up old sheets for the purpose; and if lint were needed, he scraped it himself from old linen rags, dirty at that. His success in practice largely depended upon his mechanical ingenuity in improvising and adapting crude means to ends, country air,—and luck. Faulty and crude as his means were, he,

nevertheless, often achieved a wide celebrity as a surgeon.

New York at this period was justly noted for its great medical men, especially surgeons. It is within the scope of this work to mention those only who became the most distinguished by their works—and by no means, unhappily, all of these. There were Sands, the distinguished accoucheur; Gray, the first one in America to embrace homœopathy—a fine scholar and a great man; D. B. St. John Roosa, the ophthalmologist; Knapp, his collaborator; Guernsey, full of public spirit and devoted to the destruction of sects in medicine, the removal of disharmony in the profession, and the advancement of medical institutions; Steven Smith, who, in 1875, successfully carried through the Legislature a bill for the establishment of a State Board of Health—the second one of the kind in the United States; the Austin Flints, devoted to medical advancement; James Rushmore Wood, who for many years was Surgeon-in-chief at Bellevue Hospital, and who was professor of surgery there when the collegiate department was organized in 1860, partly through his influence.

Dr. Wood merits more than a mere mention. He was in the forefront of movements to advance the cause of medical education in New York and to improve its medical institutions. Wood was born in the State of New York (Shelburne) in 1816; studied medicine at Castleton, Vermont;

graduated there in 1837 and came to New York to make a career. His taste was for surgery, and ere long he was made chief surgeon at Bellevue, which was then under the Board of Ten Governors. The author remembers his efforts, with other enterprising surgeons, to get a bill through the Legislature authorizing placing the bodies of the vagrant dead at the service of the medical colleges. Heretofore, as late as 1857, they had been sold to students of colleges surreptitiously by janitors of hospitals. Sir Astley Cooper was having a struggle with the Parliament of England on the same subject about the same time.

Professor Wood was a bold operator and preferred operations that had not been essayed before. He must be rated among the most distinguished surgeons of the world in the seventh decade of the nineteenth century. He died in 1883.

Friedrich August von Esmarch deserves a brief mention among surgeons of the decade. He was born in 1823, three years before Lister; studied medicine at Kiel and Göttingen, and distinguished himself as an assistant surgeon in the Prussian Army in the Schleswig-Holstein War, and later in the struggle between Germany and France in 1870–71. Esmarch holds a place among distinguished surgeons of the nineteenth century; but his chief claim to the memory of the profession is the "Bloodless Method" in

amputations and the treatment of aneurisms, with which his name is identified. Esmarch, while he was not a teacher, nor a writer of prominence, was nevertheless a credit to the art of surgery. He died in 1908.

Lewis A. Sayre achieved an enviable renown at this time in his specialty of Orthopædic Surgery. He was a colleague of Dr. Wood at Bellevue, as Professor of Orthopædic Surgery there, in which department of science he won a world-wide celebrity. Professor Sayre had a genius for operations, which made him especially resourceful in devising appliances to meet the peculiarities of the many deformities that were brought to his attention. He was the first in America to perform successfully for morbus coxarius. That was in 1854, before the time of Listerism. Sayre possessed a large degree of public spirit like his colleague, Professor Wood, and did much to improve his art. In that specialty he had a world-wide reputation, and was the recipient of embarrassing tributes from foreign surgeons on the occasion of his going abroad. Sayre was born in 1820 and died in 1901.

In lying-in cases, the surgeon's procedures were of like character—crude. If the case were tedious and complicated, and at a stage requiring prompt measures, he did not trouble himself about sepsis or puerperal septicæmia. Off went his coat and up went his sleeves. He had just dropped the reins at the gate, it may be, and

hitched his horse to the fence post. His hands were probably clean when he left his office; he presumed they were clean now. It is a case for forceps, and he proceeds to adjust them. He assumed that they were clean; the presumption is otherwise. Or, there is a mal-presentation requiring manual interference, which he is equal to, of course. With unclean hands, though skilled they may be, he manipulates 'mid lacerated and bleeding tissues, and delivers the child. The grateful mother is full of prayer and praise, and he the recipient of heart-felt gratitude from a happy husband. He applies a bandage—but no douches or cleansing lotions are ordered. The case is left in the care of an extemporized midwife, and he departs. But if the mother escape puerperal peritonitis, she will be fortunate. Puerperal fever often followed as a result of such wanton disregard of hygienic and antiseptic precaution. But for the purer air of the country districts, "child-bed fever," the fear of all lying-in women at that day, and doctors, too, would doubtless have been a more frequent and fatal occurrence. In the lying-in ward of the hospital, no precautions were taken to isolate it from the surgical ward. The consequence was a fatality from puerperal fever of forty per cent. in this decade at Bellevue Hospital. One wonders that it was not greater.

Such was the state of surgical practice, and such were some of the conditions under which the surgeon won his laurels, when Sir Joseph Lister

came upon the scene. There was no lack of surgical technique, nor lack of learning and ability. The distinguished cultivators of the art knew their anatomy, every tissue, tendon, muscle, nerve, vein, artery, and their anastomoses and ramifications to the minutest detail; every bone, organ, gland, and ganglion, and their precise site, relations, and connections; but they did not know the secret invisible foe that lurked in the operating room to baffle the skill of their most successful operations. In the seventh decade of this century anæsthesias were in general use. Pouchet and others had, long since, demonstrated the presence in the atmosphere, under conditions the most salubrious, of myriads of infusoria, spores, and bacteria. Pasteur had, some years since, proved the infectious nature of these things when introduced into open wounds and they had gained access to the blood; yet, until the beginning of this decade, there was not a man, among all the brilliant men we have mentioned with admiration, with genius to solve the problem of how to protect wounds from infection, until the advent of Joseph Lister. This was in 1861. Carbolic acid had been discovered a few years before, waiting, seemingly, for Lister to use as a germicide in surgical dressings. His first experiment with it was successful, and opened a new era in the new science of surgery. Nevertheless, it was slow of adoption by the profession generally. Distinguished surgeons, even, were skeptical of the

value of Lister's discovery, whether through envy, or an intense conservatism which possesses some minds, we know not. But Lister was compelled, again and again, by public lectures in London and Edinburgh, to set forth the value—yea necessity—of antisepsis as demonstrated in his own professional experience. Even the great Erichsen, his former preceptor, while expressing no disbelief, indulged in no enthusiasm over the subject.[1]

Joseph Lister, surgery's greatest genius, was an Englishman, born at Upton, in 1827. He had genius back of him, his father, Joseph Jackson Lister, making the study of the microscope his specialty, the construction of which he greatly improved. The Royal Society of London made him a Fellow in 1834 in recognition of his microscopic "Observations of the Blood and Animal Tissues."

The son, Joseph Lister, was sent to a private school in London at an early age, and when fitted for college, was sent to the University College, from which he graduated a B.A., in 1847 at the age of twenty. He then began the study of medicine at the medical department of the same University, graduating an M.D. at the end of five years, during which time he wrote several original and important theses, and became a member of the Royal College of Surgeons. About this time (1852) Lister went to Edinburgh to

[1] *Vide* Preface to second edition of his *Surgery*.

take a surgical course at the clinic of the celebrated surgeon, Professor Syme. It was here that the genius of the man showed itself. At the end of twenty years he was known as one of the first surgeons in Europe. From 1860 to 1869, he held the Chair of Clinical Surgery at the University of Glasgow; from 1869 to 1877, he held the same position in the University of Edinburgh; from 1877 to 1893, the same position in King's College, London.

It was during Lister's studies and investigations in histology and bacteriology at Edinburgh that he became interested in the researches of M. Pasteur. The papers of that period were filled with the events of the merciless war in the Crimea and the horrors of hospital and camp fever which were raging there with unprecedented fatality. It was said that more deaths were being caused by disease than in battle. This fact is said to have produced a profound impression in Sir Joseph's mind, and led him the more seriously to reflect on the demonstrations of M. Pasteur, at Paris, of which we have given a brief account in the previous chapter of this volume. Lister could not disabuse his mind of the fact that the air carried contagion to wounds, and not only air, but all the clothing, dressings, sponges, and instruments used in operations were likewise sources of infection, and the cause of putrefactive changes in the blood. Before this definite conclusion had been reached by him,

surgeons had begun to use deodorants and to practise a sort of sanitation in the hospital wards and operating rooms, and to enforce a more strenuous regard for general cleanliness. To this end, Kuchenmeister of Dresden had been using carbolic acid with good results. This was in 1860. In this reform Lister was at the forefront. In 1867 he was constrained to write:

> Turning now to the question how the atmosphere produces decomposition of organic substances, we find that a flood of light has been thrown upon this most important subject by the philosophic researches of M. Pasteur, who has demonstrated by thoroughly convincing evidence that it is not to its oxygen or to any of its gaseous constituents that the air owes this property, but to minute particles suspended in it.[1]

Even then, in 1867, Lister was judiciously guarded in expressing his opinion as to the nature of infectious "particles suspended in the air." He avoided use of the phrase pronounced by M. Pasteur, of "living organisms" circulating with the dust of the air. But that was the actual fact, the living momentous truth of the subject, of which this careful student of science soon became convinced, and devoted his great genius to its practical application to surgery.

Lister's first experiment with antisepsis was in 1864 in the treatment of compound fractures, having become convinced that it was the air ad-

[1] Mumford, *Surgical Memoirs*, p. 106.

mitted to such fractures that caused their fatality; and that the problem which the surgeon had to face was simply how to protect the patient from its offending germs. For that purpose he first cleaned the wound with carbolic acid and dressed it with lint soaked with the acid.

The exudations mingling with the acid formed a paste which soon hardened into a firm scab. In order to prevent too rapid evaporation of the agent, he laid over this dressing a block-tin shield. So long as active inflammation did not appear, the carbolic scab was painted daily with more carbolic to keep in force a fresh supply of the germicide, and the shield was re-applied daily. The surprising success of this treatment in the case of compound fractures led to its employment in abscesses and in flesh wounds. Sometimes it was impossible to secure exudate of proper quality to mix with the carbolic for a paste; so an artificial paste of linseed oil, carbonate of lime, and carbolic acid was devised. This was Lister's famous "antiseptic putty."[1]

Such was the practical initiative of antiseptic surgery. It was so successful in compound fractures, which were uniformly so fatal, that the procedure was extended to all operations involving lesions. The results amply justified the expectations of its author. "The effects of the new treatment upon the wards," says a chronicler, when these experiments had been made, "were in the highest degree beneficial, converting them

[1] *Op. cit.*, p. 108.

from some of the most unhealthy in the kingdom into models of healthiness."[1]

The "New Treatment," as it was called, although brilliantly successful from the start, met with skepticism and reluctant admissions from a majority of the profession. The eminent Professor Syme having retired from the Chair of Clinical Surgery at Edinburgh in 1869, Lister was called to succeed him. The first lecture before his class was devoted to antiseptic surgery. Although the world had heard of it, the great surgeons of the army, the distinguished Esmarch, Volkmann, and others had put it in practice; the leading surgeons of America had adopted it; still, at old Edinburgh, Professor Lister found it a weary task to persuade his students of its truth. They listened to him, as with an "indulgent smile." One can easily imagine that the new treatment was regarded as a fad of the learned Professor, to be respectfully tolerated, and not to be taken with that degree of seriousness in which it had been presented to them.

> These views were new to most of his listeners [says an interesting chronicler] and were heard with many questionings; but he continued to expound, to practise, to demonstrate so effectively that when he left Edinburgh, eight years later, his theories had been received there, and his precepts were followed in some fashion.[2]

[1] *Op. cit.*, p. 109.

[2] *Op. cit.*

After eight years of expounding, precept upon precept, demonstration upon demonstration, his views were received and followed "after a fashion!" Such is the experience of revolutionary ideas that have for their object no profits and spoils; such has been the fate of all reformers that have no money to offer as the reward of accepting their views!

Lister retired from the University of Edinburgh in 1877 and went to London, having been urged to accept the Chair of Clinical Surgery at King's College. He was then fifty-one and entertained thoughts of withdrawing from active practice. Nevertheless, he accepted the proffered Chair and occupied it, until 1893, when he retired from official positions involving active work. In 1896, however, he was still expounding *a*septic surgery, instead of *anti*septic surgery, before the British Medical Association at its meeting at Liverpool of that year, of which Association he was President.

Lister may be said to have won his triumph when he retired from Edinburgh in 1877. It was doubtless the consciousness of the fact that led him to feel that he had nothing more to do, rather than a feeling of weariness. He was then really in his prime, at the age of fifty-one. Again, therefore, he resumed his clinical work at King's College, adding new laurels to a career already the most famous in the annals of surgery. The use of carbolic acid in surgical dressings he soon

laid aside as being an irritant poison, for milder but equally efficient antiseptics and measures. Heretofore his object had been to exclude air from fresh wounds; later he found a way to exclude the offending germs in the air without excluding the air itself. Tyndall and Pasteur, both, many years before had found ordinary cotton-wool an effective way of intercepting bacteria from organic infusions, admitting at the same time the harmless atmospheric air. The demonstrations of these scientists were subsequently acted upon, at least so far as to use sterilized gauze instead of cotton-wool, by Professor Lister and by surgeons generally. It is thus that antiseptic surgery became aseptic surgery, and that the reproach cast upon the life-giving element, of being dangerous to life and health, was removed. Referring to this period in the career of Professor Lister, Dr. Mumford eloquently says:

> Twenty-five years ago (1877) Lister had won his victory, and saw his principles adopted throughout the surgical world. Who may tell the effect of that victory on surgical progress? No man has reckoned the immeasurable saving of life, the incomputable relief of suffering, the opening of new surgical fields. Daring has become conservatism; rashness has become common sense. The cranial cavity, the thorax, the abdomen, the lungs, the heart, the intestines, joints, the ear, the eye, regions and organs which were once sacred to the action of disease, which were

inspected on the post-mortem table only, are now open freely to the renovating measures of the surgeon and to the gaze of every medical student.[1]

Jenner's generalization was a boon to humanity and marked an advance in the progress of medicine; Lister's was incomparably greater: it laid the foundation of a new epoch in surgery; it removed the barrier that had blocked the advancement of surgery from the beginning. It opened the way for what had been an art of uncertain tenure, to become a science, humane and beneficent, the scope of which is not yet unfolded to mortal vision.

Professor Lister has been honored with degrees and tokens of respect from learned societies and institutions from every part of the civilized world, to an extent incomparably greater than was ever conferred upon any man. He has never won a hundred thousand dollars a year, nor received the fees of a McBurney or an Erb. Victoria made him a baronet in 1883, and in 1897 he was raised to the peerage, which gave him the title of baron, or lord, which is supposed to have made him the equal of a Bacon or a Brougham. Were these honors and titles needed to secure him a place among the Immortals? To us they seem an insult to Nature from the puerile.

In closing this brief dissertation on Professor Lister we cannot forbear to quote and to endorse a few words from an eminent surgeon, Dr. James

[1] *Op. cit.*, p. 111.

G. Mumford of Boston. Writers are wont to describe surgeons as great for their knowledge, their multitude of patients, their writing of books, their popularity as teachers. A lower estimate is to count him a great surgeon who is a great handicraftsman. But who shall be numbered with the Immortals? We know that mere mechanical facility in surgery is not enough. It is permanent contributions to knowledge that count. The uninformed look to closet students for such contributions; but have we not seen great operators who were great contributors? Mere operators are not known to history. Even the typical clinical surgeon, Paré, is memorable to most men by his invention of the ligature only. In our own time and in America the question of the appendix has agitated men. Surgeons have reported their hundreds of appendicotomies amid the winding of horns and screams from the gallery gods, but the prize lies with the modest scientist, who twenty years ago gave to the world a single paper in which he described the significance of the appendix and its rôle in disease. Three years ago (1905) only was he awarded with LL.D. by his Alma Mater![1] The author refers here to Dr. Reginald Fitz. We cannot believe that the degree of LL.D., although an honor not to be despised, was the kind of reward that he expected or desired. The men who do things help themselves to their rewards. If the great scientist

[1] *Surgical Memoirs*, p. 112.

or discoverer in any department of knowledge awaited the pleasure of the world for the rewards of right thinking, patient and painstaking toil by day and by night, he would wait long, and, in a large majority of cases, die waiting and in want.

The seventh decade of the nineteenth century was, indeed, an epoch-making one for surgery. The profession had to reform itself, to change its course, and to proceed along new lines. Old notions had to be given up, or give place to new ideas. Fictions, which had held possession of the common mind for centuries, had to give place to facts—material, demonstrable facts. Habits of a lifetime had to be reformed, and new procedures adopted, and new methods accepted. The old stained or rusty instruments must be scoured up, or be replaced by new ones. The forceps must be soaked in boiling water before they would be fit to use. The thumb lance had to be passed through the blaze of a lighted match, the needle of the hypodermic syringe and stitching needles likewise, before the surgeon would dare to use them. The silk ligatures, for the first time in the experience of man, had to be asepticized. He could not even lance a boil, or cut his finger nails—much less his toe nails and corns—without first firing his penknife or scissors, or dipping them into an antiseptic solution! He has come to know that infectious organisms settle with the dust in the air upon his instruments, and invade

every crack and corner of the drawers and cabinet. He must no longer go on his rounds with dirty linen and hands, soiled shoes and hose, or unclean fingers and dirty nails. A new duty has been laid upon him, the duty of cleanliness, of personal hygiene, not for his own, but for others' sake. The daily ablution, for him at least, has become necessary under the new regime. It is no longer proper to visit the sick with an offensive breath from disordered stomach or carous teeth, or tuberculous tonsils or odorous adenoids, catarrh of the nasal passages, etc. Disease germs invade these passages of the mouth and throat, and are given off in great profusion, to be imbibed possibly by those to whom he is administering. Moreover, he should not go, as heretofore, from an infectious to a non-infectious case without the precaution of changing his clothes, and fumigating his hair with antiseptic spray. These are small matters and personal, but what dire and dreadful consequences might follow the neglect to observe them!

Moreover, the new epoch wrought a revolution in the conduct of hospitals, insane asylums, and public schools. The new order which Lister's discoveries caused to be introduced into hospital wards and operating rooms was revolutionary. It called for more attendants and nurses; a free supply of water, and bathing facilities.[1] To

[1] Few hospitals were supplied with bathrooms in 1860—Bellevue had but one!

carry them out conscientiously was to double the expenses of the institution. To meet the new requirements, surgical pharmacies, for the manufacture of surgical supplies and implements, sprang into existence all over the civilized world. A new industry was thus created to meet a want which was indeed a great one.

The Training School for Nurses

Another necessity arose in carrying out the new order of hospital and hygienic equipment, which one wonders had not been met before. At this period, 1870, there was but one regular training school for nurses in Christendom, namely, the one founded by Florence Nightingale at St. Thomas's Hospital, England, in 1860, on her return from the war in the Crimea. Such women nurses as the exigency of war had forced into the service were totally unlearned, either by study or experience. The war in the Crimea, which was waged in the previous decade by certain so-called Christian nations, with a fatality from bad food, disease, and wounds so dreadful as to shock the sentiments of Christendom, naturally enlisted the sympathy of women, the most notable among whom was the incomparable Florence Nightingale,[1] who volunteered her services as a nurse. There she won the distinction of introducing to field and camp hospitals some method and order in

[1] Died August 14, 1910.

place of the wretched chaotic condition in which she found them. Ignorant of the art of nursing when she went to the Crimea, she soon became learned and proficient by experience and observation, and produced her "Notes on Nursing," the first book of the kind that was ever written—by a woman, at least. To the poor sufferers in the Crimea she was as a messenger of light from heaven! It was the publication of her book, together with the account of her experience in camp hospitals, that awakened in England and America an interest in the subject of women nurses. The War of the Rebellion, which followed that of the Crimea and preceded the Franco-German struggle, had the effect of creating a public sentiment in favor of women's education as professional nurses. It was a new field of industry for women, created by the exigencies of war, of wide scope and usefulness. The scheme took definite shape in 1872 by the Faculty of Bellevue Hospital College, of New York City, organizing the first Training School for Nurses that America had known, excepting perhaps that of the Massachusetts General Hospital at Boston. The following year, the example of Bellevue was followed by the ladies and physicians of the Brooklyn Maternity. The Brooklyn Maternity was organized some years previously by a few enterprising ladies, with a Board of Managers whose president was Mrs. Reuben Moffatt, a woman of public spirit and rare tact and judg-

ment. Early in 1873, they organized a Training School for Nurses on the plan gotten up by Bellevue. The faculty in each of these institutions were the teachers in the academic department. Each had the same curriculum, adopted a two years' course of study, and awarded certificates to such pupils as passed the examinations.

Ere long the movement, a product of necessity, spread to other hospitals, not only in Greater New York, but to most hospitals in large cities throughout the States of the Union. The rules made for the guidance of these schools were most strict and rigid; the graduates were put on probation a year, and the certificate was conditioned on moral conduct at the end of it. One wonders how many graduates in medicine would have stood such a test! The course of study was afterwards increased to three years, and the curriculum not far below that of the medical student. The graduated nurse was required to have a knowledge of poisons and their antidotes; dosage of medicaments, especially such as were used hypodermically; the use of the hypodermic syringe, the catheter, the stethoscope; to have an acquaintance with the normal and abnormal heart and pulmonary sounds, with their significance; methods of flushing the colon; artificial feeding; a knowledge of the chemistry of food and of cookery; the physiology of digestion and assimilation; some acquaintance with anatomy, physiology,

and hygiene; how to treat emergency cases in the absence of a physician; the application of bandages to various parts and varieties of conditions, etc., etc. The Training School for Nurses prepared for high service a corps of young women of good family and excellent character, animated by a desire to be independent, self-supporting, and of service to the sick. It opened a career for a most deserving class of women. With the advent of women in the sick-room, the male nurse was soon put out of business.

In the organization of the training school for the education of nurses we must accord to America the credit of leading the world in a most worthy and benign movement.

The training school for nurses is, therefore, a modern institution. It may be said to have arisen from grim necessity. Women were its pioneers; women were its teachers; and women were its pupils. Florence Nightingale, as has been observed, took the initiative in the great movement of educating nurses, moved and inspired by her experience in the great war of the Crimea. She was the head and front of a movement that spread over the civilized world with great tardiness. Twelve years elapsed before the movement reached America, and American hospitals awoke to the necessity of their subsistence. While the system of teaching nurses in hospitals is generally conceded to have originated with Miss Nightingale, the New York

Hospital claims precedence and gives that distinction to one of its chiefs, Dr. Valentine Seaman, who, in 1798, "conceived and initiated the first system of instruction to nurses on the American continent."[1] But his was not a training school for nurses. It is true, also, that Dr. Warrington, in 1839, at Philadelphia, gave a course of lectures on nursing and midwifery—for the midwife was an institution in those days—and initiated a society composed of women for the training of nurses. This organization, if such it may be called, did not reach the dignity of a training school, however, until a later period.[2]

Boston, likewise, claims the honor of establishing the "first training school for nurses in America," by a course of lectures on nursing at the New England Hospital for Women and Children. It does not appear, however, that a regular school for nurses was organized there at that time. This hospital has the distinction, however, of being the first to admit women physicians to its wards, moved so to do by the influence of Prof. Oliver W. Holmes. Among the physicians who had this privilege, was the distinguished Marie Zakrzewska. It was not until 1872 that the New England Hospital for Women and Children organized a regular Training

[1] See the excellent *History of Nursing*, in two volumes, by the Misses Nutting and Dock, published by G. P. Putnam's Sons, 1907.

[2] *Op. cit.*, vol. ii., p. 326.

School for Nurses. The Bellevue Training School for Nurses was established at the same period, as we have seen, and must share the honor with its sister of being the first in America to establish this most beneficent reform.[1]

The system of keeping records of cases, symptoms, dosage, temperature, respiration, and pulse-rate, etc., was first introduced at the Bellevue Training School for Nurses in 1874, under the superintendency of the distinguished Sister Helen, of All Saints' Hospital, by the head nurse at that time, Miss Linda Richards. It was found to be indispensable to any degree of certitude in the treatment of the sick. The physicians found it so helpful that it was soon brought into general use in hospitals. Ere long the system was extended to private nursing. Miss Richards graduated in 1873 from the Maternity Training School for Nurses, Brooklyn, New York, following its first term, being one of five graduates with a one-term course. This Training School was founded the same year by a corps of public-spirited ladies, with a staff of physicians at their head, of which Dr. Albert E. Sumner was its chief.[2]

In this most humane and important work in the medical profession, women have played a most conspicuous part. The regeneration of the hospital from being a pest-house, which in fact it was a third of a century since, in which more

[1] See *op. cit.*, vol. ii., ch. viii., p. 326 *et seq.*

[2] Personal recollections.

diseases were caused than cured, to become a place of sweetness and light, was the work of women.[1] So also was the institution of the training school for nurses. Of a truth it may be said, therefore, that if the first man was the first physician, the first woman was the first nurse.

There were few departments of medicine that were not influenced by Listerism. It created a new department of medical study, that of Bacteriology. No college curriculum was now complete without a Chair of Bacteriology. The hospital, too, had to be equipped with a laboratory, a chemical and microscopic department, and the service of a professor of pathology. The method of diagnosis became changed. Symptomatology was largely discarded. Physical diagnosis and etiological demonstration took its place. A drop of blood of a fever case, or a little sputum of a tuberculosis suspect, determined the nature of the fever in one case, and the nature of the cough in the other. If the kidney were suspected of Bright's, the microscope settled the truth of the matter;—chemical urinalysis was disparaged, though not superseded. Its conclusions were not final. It was lacking in certainty—in demonstration. That required the microscope, and an expert behind it.

[1] At Bellevue Hospital, prior to the introduction of the trained nurse, 40% of the lying-in cases died. Nor was it suspected that the Surgical Ward, located under that of the Lying-in, with free intercourse between them, had anything to do with this fatality! At that time there was but one bathroom in the institution! *Vide History of the Training School for Nurses*, vol. ii., ch. viii.

If one presumed to estimate the influence of Listerism on surgery, the facts would overwhelm him. The details could not be written within the confines of a chapter. They would require a volume—nor then would embrace the whole. It created a new science of greater scope than bacteriology. We refer to Gynecology, which in this creation alone conferred upon half the human race a blessing of incomparable importance and extent. In this and other departments of surgical operations, Listerism was supplemented by the discoveries of Morton and Simpson, which, by a wise provision of providence, preceded the discovery of Sir Joseph Lister. Following this decade (seventh), there was no part of a human body that the surgeon might not safely enter and perform any necessary operation, while the patient slept peacefully unconscious of the performance. Gastrotomy was performed with impunity; portions of the ileum, for intussusception, amputated; bullets in the heart extracted, and stabbed wounds of that organ sutured; the pylorus and spleen amputated; the ductus choledochus opened for gall-stones; the pleural cavity drawn of serum and pus by aspiration; pus cavities in the lungs drained likewise by the same method; the brain opened and cysts removed; clots from extravasation of blood located and removed from its hemispheres; dangerous aneurisms safely ligated in various parts of the body; necrosed bones excised and joints exsected; laparotomies,

appendicotomies, historectomies, ovariotomies, and other daring operations within the abdomen undertaken; and all manner of delicate operations on the organs of special sense performed, to the preservation of their functions and the comfort of the afflicted. And by no means least of these humane procedures were operations on the congenitally deformed and crippled, by which symmetry was produced where before was unsightly asymmetry. Dr. Lewis A. Sayre, Professor of Orthopedic Surgery in Bellevue Medical College and Hospital, was author of a valuable contribution to that branch of surgery, in his great work on the subject, which appeared in this decade. Professor Sayre was a skilful and original operator, and the inventor of many new measures and appliances in the treatment of club-foot, spinal curvatures, etc., of which we have already made mention. The magnitude of this field of surgery was only partially revealed in the annals of a Sayre or a Lentz. But all of these things, however important they were, sink into insignificance compared with what the development of gynecology has done and is doing for woman. This subject demands more than a passing notice.

Medical colleges had from the beginning a Chair of Obstetrics, and its scope was gradually enlarged to include diseases of women and children; later, the branches were separated; the Chair of Obstetrics was retained, and another Chair instituted devoted to the Diseases of Women

and Children; still later this department was again divided, and a Chair devoted exclusively to Diseases of Women—Gynecology; Diseases of Children became a distinct specialty. These divisions became necessary by reason of the growth of knowledge of the subjects and the increased labor involved in treating and teaching them.

In the previous decade, diseases of women was a subject that engrossed the attention of the student to a greater extent than almost any other branch of medicine. The treatment was at that time mostly topical and mechanical, with minor surgical operations. Serious operations were avoided, except in cases of extreme urgency. Many able and learned physicians in Europe and America had written cleverly on the maladies of women, meaning, of course, maladies that involved the sexual system. In America at that time Professor Charles Delusina Meigs held the Chair of Midwifery and the Diseases of Women and Children in the Jefferson Medical College, Philadelphia. Meigs was born at Bermuda in 1792, and died in 1869. Philadelphia was famous at that time, 1840–1850, for the character of its medical men and its medical schools. Many of the former were graduates of the Edinburgh University, and were deservedly held in high esteem. Among them was Professor Meigs, whom we have just mentioned, and who had already written a fine text-book on "Obstetrics," which

was generally preferred, on this side of the water, to that of Ramsbotham, of London; a work on "Child-bed Fevers," which the *Edinburgh Medical Journal* pronounced the "ablest that had been written on that subject"; and yet another work on "Diseases of the Neck of the Uterus," which at once became an authority, as had the preceding ones. The last work of this versatile author was entitled "Woman: her Diseases and Remedies."

This work is a curiosity in modern medical literature. It embraces a series of letters on woman, etc., addressed "to his class." It would seem as if the author had chosen this form of presenting the subject to his students in order the more fully to indulge his great powers of expression, and to display his classical lore and learning. Be that as it may, the author quotes from the Latin poets, from Shakespeare, and other English poets, and from French writers of sentiment to illustrate his delicate themes, and gives free range to his own exalted sentiments in regard to the function of woman as wife and mother in language rhetorical and hyperbolic. He fluctuates between science and sentiment from time to time throughout the volume of nearly eight hundred octavo pages. The work ran through several editions and had a large sale. It contained many sensible, semi-professional suggestions; and on the strictly professional side of his subject his suggestions and prescriptions

were wise and judicious. Meigs was learned, able, and scholarly, and a popular teacher.[1]

In a previous chapter we gave a brief account of the first operation for removal, in 1809, of an ovarian cyst by Dr. Ephraim McDowell. McDowell had had no previous experience in laparotomy and knew nothing of aseptic surgery. It was a rash performance, and created a furore all over Europe. That it was successful was doubtless due to good luck, which often waits upon rashness, and good air.[2] Had the operation been performed in one of the New York or European hospitals, instead of in the wilds on the frontier, it would almost certainly have proved fatal. However that may be, the exploit of McDowell made him justly famous, and gynecologists to vie with each other in doing him honor. Following McDowell's good luck, the operation was repeated by several surgeons in Europe and America, but with such meagre success as to render it forbidding and unpopular, until the decade of which we are writing.

With the advent of Listerism, laparotomy became the order of the day. It was so safe a procedure that the surgeon did not hesitate to open the abdomen on the smallest possible pretext. That the pretext often proved to be unnecessary was a secret which rarely got out of

[1] Personal recollections.

[2] The woman, a Mrs. Crawford, lived thirty-two years after the operation.

the operating room. The patient was none the worse for it, nor better.

A great onslaught was made at this time on the ovaries, and ovariotomy became at once a lucrative business. Spencer Wells, a distinguished gynecologist of England, reported, in 1865, one hundred cases that he had performed. In 1873, he reported five hundred cases. The gynecologists were busy in every capital in Europe. New York gynecologists were certainly not much behind in the business than their English cousins. We believe they were far in advance of them, for the practice was not confined to specialists, but was extended to all surgeons who felt themselves competent to perform the operation. New York, Philadelphia, St. Louis, and Chicago, counted large numbers of gynecologists among their physicians, of distinguished repute, who could number their ovariotomies by hundreds the first decade of Listerism. The operation was performed for a variety of causes, not all of them owing to disease. In 1880, it almost seemed to be an epidemic among women, which the more reputable gynecologists, of whom Professor Skene was conspicuous, thought it advisable to check, and declined to operate except in cases of demonstrable serious disease. But the number of women who were unsexed the last quarter of the nineteenth century is believed to have been enormous. This was the obverse side of the picture. There was another

side of it. In spite of such abuses, occasional mistakes in diagnosis, and procedures on them, only the surgeon of the period can have any adequate realization of the suffering of women from uterine and ovary diseases that they have with patience borne for ages, as inevitable to their lot! Multitudes of women have gone into premature graves, or dragged out a miserable existence, who might have been relieved of their malady and their lives prolonged and made comfortable, if not happy, by aseptic surgery. It was no uncommon sight at this period to see women carrying several gallons of serum in ovarian cysts which the surgeon dared not to aspirate; or suffering profuse hemorrhage from uterine fibroids and polypi which he had not the courage to remove. Paracentesis of the abdomen for dropsy or ascites he did not hesitate to perform, but a similar operation upon an ovary, never! Even the introduction of an exploring needle had been known to prove fatal.

Things had now changed. So great became the demand for uterine surgery that it drifted into the hands of a class who did nothing else; often into the hands of a class that made it a trade, and for discreditable if not unmoral purposes. This class of surgeons was expert in uterine surgery. The colleges established a chair for it—the Chair of Gynecology, from which the art of uterine pathology and therapeutics was taught by expert gynecologists. These chairs were soon

filled by the most distinguished surgeons and physicians of the country. America being the most enterprising country of the world, naturally leads the world in all new things, substantial things as well as fads and fancies. It is not too much to say, perhaps, that her gynecologists have no superior in Europe, possibly no equal. It was not uncommon for them to open sanatoria, supplied with means and every convenience for the treatment of diseases of women. Better and speedier results were obtained in such institutions, besides being more lucrative, a desideratum not to be overlooked by an ambitious surgeon.

The science of gynecology was rapidly advanced by these means, and the gynecologists, by their learning and skill, were justly entitled to the wide celebrity that they won. Among the first to distinguish himself in that department of medicine in America was Thomas Addis Emmet. Emmet was of Irish extraction, although a Virginian, born in 1827. He graduated from Jefferson Medical College in 1852 and settled in New York, at first as a general practitioner, but drifted into gynecology. In 1862 he was Surgeon-in-chief to the Women's Hospital. From this time on he devoted himself exclusively to the diseases of women, in which he acquired a great celebrity, not only by his originality, but also by the variety of his operations. In 1868, he was appointed to the Chair of Gynecology in New York's foremost college, that of Physicians

and Surgeons, which he held until 1879. Dr. Emmet was a man of great natural ability and force of character. His views were his own and he did not fear to express them. He wrote many papers on various surgical procedures in his specialty, but published no distinct treatise on gynecology. His contributions to the literature of the subject, however, were considerable, and added much to advance the art and science to which he devoted his life. Emmet had a sanatorium of his own in which he treated his private cases.[1]

Theodore Gaillard Thomas was a contemporary of Emmet, and devoted himself to the same branch of surgery. Thomas was a man of great ability, a fine scholar, a facile writer, and a lucid teacher. No man before him ever did more to advance the science of gynecology. His work on the "Diseases of Women" took high rank and made him widely known abroad. Thomas was at one time Professor of Diseases of Women and Children in the College of Physicians and Surgeons. He was the first to operate for ovariotomy by way of the vagina, which never became popular. His papers on tubal pregnacy, a case of which he reported, and on diseases of the vagina and uterus placed him in the first rank of gynecologists. He was among the few American physicians who had a foreign reputation.

[1] Personal recollections. *Dictionary of American Biography.*

Thomas was born in South Carolina in 1831, graduated at the Charleston Medical College in 1855, and began his medical career in New York City the same year. He, too, had a sanatorium of his own for the care and treatment of private patients.[1]

Alexander J. C. Skene belongs to this period although his chief work was done later. He was a contemporary of Drs. Thomas and Emmet. He may not have been so popular among the lay element as they, but he possessed a professional judgment and discernment far superior to either. His character and attainments gave him rank among great men and great physicians. He might be called, without exaggeration, the "modern Hippocrates." Indeed, the pictures of the two have a resemblance. Their characteristics were alike. Each possessed self-sufficiency and an independence of conviction which led him to disregard the opinions of others. Nothing was more natural for Hippocrates, for he had few colleagues, and possessed within himself what medical knowledge his age possessed. But it is an attitude hardly proper for any man to assume to-day. Oracles have passed, and men and women who announce opinions on no other authority than their convictions, or "Thus saith the Lord" are silently ignored by thinking folks. Dr. Skene was what might be justly called an all-round man, and an all-round physician. It

[1] Personal recollections.

is rather misleading the reader to characterize him as a specialist, or a gynecologist; while he was both of these, and distinguished in them, he was also distinguished in other branches of medicine. He was an artist in surgery, a finished operator, an accurate diagnostician, a hard-working student, a resourceful physician, and possessed a judicial judgment, qualities of the first importance to the surgeon. His acquirements were of the solidest kind. He must have had character back of him and a storehouse of hereditary experience potentialized in his brain cells at the beginning; for his life was too short and his opportunities for culture too limited to have acquired the talents which were his to so remarkable a degree.

Dr. Skene was a Scotchman, born in Aberdeenshire, in 1838. He found his way to America in his youth in search of opportunities for achievements denied him at home, and began the study of medicine in the University of Ann Arbor, Michigan. He soon left there, however, and matriculated at the Long Island College Hospital, which had quite recently gotten its articles of incorporation (1859). It was here that young Skene fell under the influence of the learned and distinguished Austin Flint, Sr., who held the Chair of Physiology in Long Island College at that time. Skene graduated there in 1863. He appears to have made rapid advancement in his studies, for he shortly obtained the Chair

of Diseases of Women, at Long Island, and in 1883 published the most important and original work on gynecology that had yet appeared in English. The work was fully illustrated and contained more than one hundred original drawings. It obtained a large circulation both in America and England, and established the fame of its author. Meantime he continued to occupy the Chair of Diseases of Women—now changed to the new science of Gynecology—at Long Island, and a like position in the New York Post-Graduate Medical College, and was made President of his Alma Mater, all of which positions he held at the time of his death, which occurred suddenly in 1900.

The place Dr. Skene left vacant in the hearts of his pupils and patients as well as in those of his colleagues of Long Island College Hospital, must long remain unfilled. An excellent bust in bronze of the man decorates the entrance to Prospect Park, Brooklyn Borough, New York—a tribute from his friends.

Professor Skene's contributions to medicine are embraced in his great work on the "Diseases of Women." While not unmindful of the merits of Dr. Grailly Hewett's great work on the same subject, published in a previous decade, we do not hesitate to pronounce Dr. Skene's a greater work than Dr. Hewett's.

Skene also has the distinction of being the first to discover the existence of glands in the

female urethra situated beneath the mucous membrane, and to point out their pathological significance. Their physiology is unknown.[1]

Professor Meigs of Philadelphia, in the fifth decade of the nineteenth century, published a very readable work on "Woman," as we have seen, but of comparatively little importance to the student of medicine to-day. Professor Trall, of New York, published about the same time a practical work on "Uterine Diseases and Displacements"; and Professor Thomas published early in this decade his "Diseases of Women," by far the most instructive, original, and important contribution to the subject that had appeared with which we are acquainted. Dr. Edward R. Peasley also published an excellent treatise on "Ovarian Tumors: their Pathology, Diagnosis and Treatment," in this decade, which was an important contribution to gynecology. The work of Dr. Skene on "Diseases of Women" appeared in 1888, which advanced the knowledge of gynecology immeasurably, and placed that science and art on the high plane it occupied at the close of this century. The work makes no display of scholarship. It is not written in the elegant diction of a Dunglison, a Meigs, or a Thomas; but it is written in good, plain English, and sets forth clearly, without prolixity or redundancy, the subject of which he was master. Had he quoted from the writings of his predecessors, their views,

[1] *Vide* his *Diseases of Women*, p. 614 *et seq.*

opinions, and methods, and controverted them or otherwise; or had he, like Meigs,[1] indulged in poetry, invoked the aid of Vieny in *la Femme* to adorn a tale, or some charming couplet from Virgil to illustrate the modesty of woman; or cited lines from Shakespeare to show the fortitude of which she is capable in suffering; or written, with eloquent and rapturous sentiments, on the marvels of her reproductive functions, he would have given his treatise a show of scholarship and of versatility, which, while it would have embellished his book, would have added little of value to it that it does not now possess. Professor Skene appears purposely to have avoided all unnecessary verbiage in presenting his subject to the student. He says in the Preface. "To the medical student, history has no value until he has mastered the rudiments of the science and the art; and the practitioner can find in the works of reference all the historical facts which he may seek." And in the first paragraph of the Preface, he wastes no words in declaring: "This book was written for the purpose of bringing together the fully matured and essential facts in the science and art of gynecology, so arranged as to meet the requirements of the student of medicine, and be convenient to the practitioner for reference," etc. No work of the magnitude of Professor Skene's "Diseases of Women," a large octavo volume of

[1] Prof. C. D. Meigs's *Woman and her Diseases*, Letters to his Class, Letter IV.

nearly one thousand pages, with which we are acquainted, indulges in so few quotations and foot-references; indeed they are almost entirely absent from the work. The work is wholly his own, apparently, and presents clearly and lucidly his views and operative procedures—and those of few others. Nevertheless, gynecology was greatly advanced by him, and the profession of medicine honors the author and will continue to honor him as a man and a physician.[1]

No man in America, possibly not in the world, exerted more influence on the development of uterine surgery than James Marion Sims. Sims was a South Carolinian, born in 1813. He was educated at the Charleston Medical College, and found his way to New York City in 1853, not long after the advent of Dr. Emmet. He was a man of prepossessing manners and appearance, as well as ability, which naturally helped him in his career. Diseases of women was his specialty, and about his first movement was to establish the Woman's Hospital, the first of the kind in New York.

Sims was a genius in his art, a clever and resourceful operator, and made important improvements in operative procedures, performing many operations that had never been thought possible before, nor, indeed, were possible, until appropriate instruments were devised for the purpose. In

[1] Personal recollections, *vide The Brooklyn Daily Eagle's* Fiftieth Centennial Volume.

this respect his ingenuity seemed to have been unrivalled. Take, for example, the Sims' speculum; it is a device of exceeding simplicity, so simple that one wonders it had not been thought of before; yet without it a variety of operations on the womb, vagina, and perineum, requiring accuracy and delicacy of manipulation, would be impossible.

Dr. Sims wrote little; but performed much. His services were in demand in cases of serious import, which required more than ordinary manual dexterity; and he won his great fame, which extended throughout the civilized world, by his genius and skill as an operator, rather than by his learning, wide knowledge, or scholarship. He was simply a master of his art. His "Story of my Life," published shortly before his death, which occurred in 1883, is full of interest and well told. Gynecology owes much to the genius of J. Marion Sims, which, however, could not have come to fruition but for aseptic surgery.[1]

With the development of gynecology, and the division of surgery into general and special, which occurred in the seventh decade, there were developed other divisions in that branch of medicine: Ophthalmology and Laryngology took their rise at this time, and the curriculum of the colleges was enlarged to embrace a Chair for each of these specialties. Students of medicine, while they

[1] *National Biography: Story of my Life.* Personal recollections.

were required to equip themselves with a knowledge of every branch of medicine, including surgery, special and general, were not slow to embrace one or the other of these new specialties, and confine their practice to them. The greater degree of proficiency that they acquired in these specialties, in treating diseases of the eye, correcting errors of vision, etc., justified the separation of this branch of surgery into a special department of medicine. The same is true of diseases of the throat and ear, though perhaps in a lesser degree. This branch or these branches of practice were highly remunerative. Great fortunes were won by such as obtained eminence in them, which were justified, however, by the importance of the service rendered. For example, we cite the instance of an eminent specialist at Heidelberg who received a fee of one hundred thousand dollars for his fruitless services to the Emperor Frederick of Germany. All this special work on the throat and nose, the eye and ear, was given an impetus by the discovery of aseptic surgery and antisepsis, and of drugs for local anæsthesia, such as cocaine, the chloride of ammonia spray, chloretone, etc.

Moreover, the new specialties required hospital facilities in order to extend their benefactions, to the poor, and likewise for materials by which to obtain experience. To this end the New York Ophthalmic and Aural Institute was founded in 1869. In 1874 the homœopathic fraternity followed the example of their brothers and estab-

lished the New York Homœopathic Ophthalmic and Aural Hospital. Both of these institutions were well conceived and conducted to the advantage of the public and the profession.

SIXTH: PERIOD OF THE NINETEENTH CENTURY

(*EIGHTH DECADE*)

CHAPTER XIX

PROGRESS OF THERAPEUTICS

AT the beginning of this period the practice of medicine had not kept pace with the progress of its collateral branches. Surgery had made brilliant progress. The achievements of chemistry were unparalleled in its annals. Pharmacy had become a science,—Pharmacology—and had already its schools in Europe and America. The science of Bacteriology was firmly established, and its students and professors were achieving most important results in its study. The microscope had become an indispensable adjunct to the equipment of Health Boards, hospitals and sanatoria, and the offices of all up-to-date physicians and surgeons. It was inseparable from diagnostics in a variety of diseases in which accuracy was required as an aid to therapeutics. The science of morbid causes, Etiology, was making marvellous progress, but its discoveries were slow in being utilized—so closely was the profession wedded to its old

routine. Many of its medical formulas were long since obsolete; but the rank and file of practitioners either did not know it, or chose to follow the traditions in which they were bred, being too old to change or to adapt themselves to the new. All physicians profess to keep themselves read up to date, and would resent the imputation that they were not; yet the great body of them, if the truth must be told, were behind the times. With a large and active practice it was simply impossible for them to keep informed as to the progress of medical events. Nor were they disposed to put away text-books which they conned with affection, and adopt new ones, at least, as often as an age of scientific development, such as was the present century, demanded.

There had been in the last previous decade a steady advance in the progress of materia medica and pharmacy. Large and important additions were made to the materia medica, and improved methods of preparing medicines were introduced. With the education of druggists and the employment of clerks with a diploma from a School or College of Pharmacy, the physician was relieved from the labor of compounding his own prescriptions. That could be better done for him than by him. The era was on the dawn when prescriptions of standard formulas were put up by the wholesale manufacturers of drugs and chemicals with scientific accuracy, and supplied

to the druggists, who retailed them on the physician's prescriptions. This was a convenience all around and a saving of time, cost, and labor, but it drifted into a widespread abuse—the evil of proprietary nostrums.

The pharmacological improvements were important aids to the profession. They introduced mathematical certainty in the dose which had previously been to a large extent guess-work. There was no longer excuse for measuring a dose of strychnine or morphia on the point of a penknife; or of calomel or rhubarb in the same way; or quinine by a coffeespoonful, or guessing at grains, scruples, drachms, or grams as was customary within the memory of physicians still living. All the more active and poisonous medicines were now put up in pills and tabloids of fixed and definite quantity which the physician dispensed from his own pocket case; and when the still greater refinement came into vogue of prescribing fractions of grains in soluble form to be used hypodermically, they were found ready prepared, put up in glass tubes, a case of which the physician carried in his pocket or prescribing case.

Notwithstanding the refinements of pharmacy and the introduction of scientific accuracy in dosage, the advance in practice was inconsiderable; it was not materially changed. The standard remedies were still prescribed in revulsive and alterative doses, and what was called chemic medication was probably less practised; and in

unimportant cases milder and expectant doses of medicines were administered. Many prominent opponents of homœopathy conceded that this modification of the old practice was due to the influence of the Hahnemannians. Nevertheless, the lancet was still in evidence in pneumonia and pleurisy in the middle of the century, with counter-irritants, and antimony and quinine. Bleeding was still the first procedure in inflammations and congestions of internal organs, such as apoplexia and encephalitis. In respect of brain fever we recall the treatment of a noted case of that disease which occurred in 1861, which forcibly illustrates the status of practice in the middle period of this century in the heart of Christendom, by the educated practitioner. The victim of it was the eminent Italian statesman and Premier, Count Cavour. The Count had overtaxed his powers in the contest with Rome over Italian unity, so dear to King Victor Emmanuel's heart,—at least, such was the cause of the Count's illness as given out by his medical advisers. Be that as it may, he was taken suddenly ill with high temperature, frequent pulse, and delirium. The diagnosis was brain fever—encephalitis. Sixteen ounces of blood were taken at the outset, and one gram of sulphate of quinine administered four times within twenty-four hours. The next day all the symptoms returned, and the treatment was repeated. The third day found him no better, and again a pint of blood was taken and the

gram doses of quinine continued. The next and fourth day, the patient being no better, another pint of blood was taken and the gram doses of quinine repeated as before. That made two quarts of blood taken from a system already depleted, within a period of four days, which represented the sum of all his blood! The fifth day the distinguished patient died. Now this was called Hippocratian treatment. But in truth it was far from that. It was Empirical. The master was a wise man and a man of shrewd discernment, and treated his patients according to the indications. He would not have taken blood from an already depleted patient. No wise physician not wedded to false tradition would be guilty of so gross and fatal a procedure. The treatment of Cavour was simply *secundum artem:* the current treatment for encephalitis, without regard to the *man under treatment*, or the conditions and indications of the patient. Consultations were held over him of course; but of a truth they were farcical; for it was a classical case of encephalitis they were prescribing for, rather than the man who was suffering from it. The man was lost sight of in the disease; whereas the disease should have been lost sight of in the man.[1] Hippocrates never prescribed for a patient whom he never saw, or of whom he never heard. He laid down certain principles of treatment in general to guide the student and pupil, leaving

[1] *Vide New York Medical Times* for 1861.

their application as to conditions and circumstances to the skill and judgment of the practitioner of medicine. The gods could do no more.

The course of treatment in Count Cavour's case was that in vogue at that time by the dominant school, and had the approval of eminent authority—say, rather, counsel. That was in 1861. Ten or fifteen years later the regular treatment for that grave malady was very different. Von Niemayer, who stood deservedly high in Germany, writing of encephalitis at the close of the seventh decade says: "In very recent cases of brain fever, . . . one should employ local antiphlogistics, leeches and cold compresses." He advises pouring cold water on the head, especially if the meninges are attacked, and repeated often, the head being shaven. Moxas and setons which were formerly much employed, are of very little use, he says. The use of mercurials and iodine have been abandoned, "as they promise little benefit." He inclined decidedly to expectant treatment.

In most cases [he says] there is little to do but have the patient observe proper regimen, particularly to guard him from every thing that can increase the pressure of blood to the head, and to confine ourselves to combating the more urgent symptoms. Among the latter the apoplectiform attacks are to be treated according to the rules given for the treatment of cerebral hemorrhage, while any intercurrent

meningitis demands the employment of energetic antiphlogistic remedies.[1]

These consist of leeches to the temples, cupping behind the ears, cold wet compresses to the head, cold douches to the head; seldom taking blood from the arm and not at all except at the very outset of the disease. In acute meningitis von Niemayer approves of the use of leeches, cupping, seldom bleeding at the elbow, cold water to the head, as practised by Konckenberg (pouring), mercurial ointments, calomel and jalap, and blisters at the nape of the neck, etc. This plan of treatment in so grave an affection is a marvellous advance over that in the first decade. But it had not reached the mass of the profession in the middle of the century.

Progress in the practice of medicine may be still further seen in the treatment of some of the other acute diseases. The remedies and methods employed in the early period, on which we commentated in Chapter XIV, continued in use with slight modifications down to the middle of this period, and later, as in the treatment of Count Cavour, which we have mentioned in brief detail as an illustration. It will serve our purpose best to refer to the treatment of the diseases that are mentioned in Chapter XIV, the fourth decade of this century, for the sake of comparison.

In pneumonia, we have seen that copious bleeding from the arm at the outset was the

[1] *Text Book of Practical Medicine*, vol. ii., p. 231.

leading measure in 1800. In the seventh decade von Niemayer, writing of pneumonia, says:

In regard to the *indicatio morbi*, we must not forget, in the first place, that the natural course of pneumonia is more decidedly cyclical than that of almost any other disease, and that, left to itself in a vigorous patient, if uncomplicated, and of moderate intensity, it almost always ends in recovery. *This fact has not been known until recently. We have to thank the so-called expectant mode of treatment of the Vienna School and the success of the homœopaths for this important discovery, from which the following rules are to be drawn:* Simple pneumonia attacking persons previously in good health requires no more active treatment than does erysipelas, small-pox, measles, or other diseases of cyclical course, provided only that the extent of the disease be moderate, and that there be no complications. Indeed it has been proved that, unless warranted by special indications, active interference has an unfavorable effect upon the course of pneumonia; and Dietl is right in affirming that this disease, when treated by bleeding, more often terminates fatally than where no venesection has been employed. It is quite a different matter to compare the cases in which we bleed, not because of pneumonia, but in spite of pneumonia, and for fear of certain complications, with those cases in which, upon principle, blood-letting is never practised.[1]

Again he writes:

[1] *Text Book of Practical Medicine*, vol. i., p. 184. The italics are ours.

The number of bloodings which used to be practised by Bouillaud and other disciples of the *saignée coup-sur-coup* school likewise tend to support the experience of Louis, Dietl and others, that blooding is no specific, and that it does not even cut the process short. In fact the bleeding had to be repeated and continued until the third, fifth, or seventh day—that is, until the terminal day arrived—when the cycle of the pneumonic process was complete.[1]

Professor Osler, in his work on Practice, which was published in this decade, advocates expectant procedures in pneumonia and pleurisy, and greater reliance on Nature.

The views of the distinguished Niemayer show a most marked improvement in the practice of medicine within a decade. If we now turn to the author's treatment of pleurisy we shall find still more evidence of it. Turning to page 170 of the same volume, we find the author declaring himself as to the treatment of pleurisy in this wise:

[The] antiphlogistic system, with its general and local blood-letting, its exhibition of calomel and inunction of mercurial ointment until salivation is produced and its subsequent derivation by blistering, etc., which formerly used to be the general practice in the treatment of pleurisy, but which within the last ten years has fallen into discredit, recently has again been urgently recommended by Joseph Mayer, in a work which gives evidence of great industry.

[1] *Op. Cit.*, p. 185.

The arguments of this author in favor of the former method of treatment, and against the less active modes of procedure, are, however, based upon a very slender foundation. Thus, great weight is laid upon the fact that a certain number of patients with large pleuritic exudations have been received into the Berlin Charité Hospital, who have not been bled, and who have never taken any mercury; and it is inferred that the profuseness of the effusion is a consequence of neglect of active treatment. The enumeration of such cases as these proves nothing, unless the number of cases who have not been bled, and yet who did not have large effusions, and who therefore did not seek admission at the Charité, be also given. But even the somewhat limited number of cases observed by Mayer and others, in which recent cases of pleurisy, being treated by copious blood-letting, did not result in effusion, have not converted me. The assertion that pleurisy which is ushered in and accompanied by very acute symptoms, if left to itself, almost always terminates in profuse effusion, difficult of reabsorption, I consider as quite erroneous. Indeed the greatest danger in this respect is to be apprehended from the pleurisies which come on in a manner almost imperceptible, and whose duration is extremely tedious.

I still believe [continues the author] that venesection can be dispensed with in the treatment of pleurisy, with the exception of a few rare cases, where certain symptoms demand it. I am convinced that it neither cuts short the malady, nor prevents the effusion; and as this disease, owing to its tedious course, is always liable to lead to deterioration of the blood and to consumption, I regard the practice

of bleeding as still more dangerous in pleurisy than in pneumonia.[1]

Nevertheless, the author in the next paragraph says: "At the commencement of an attack of pleurisy, I cannot sufficiently recommend the use of cold and of local blood-letting"—not by venesection from the arm, as has been customary, but by leeches and the application of cut-cups. He would also apply mercurial ointment, but not to the extent of making the mouth sore—a very difficult precaution to act upon should the unguent be rubbed in well as he advises,—since mercury is slow of action and cumulative in its effects.

Professor Adolph Stümpell's great work on the "Practice of Medicine," which was published a decade after von Niemayer's, sets forth views of practice in acute diseases in accord, with few exceptions, with those of von Niemayer. The reaction from the advanced doctrines of practice, which had been anticipated and feared by von

[1] These citations from the great work on the *Practice of Medicine* of the very able and learned Felix von Niemayer are from the eighth English edition, translated from the German by Messrs. Humphreys and Hackley, of New York. The first edition of this work appeared in 1869; the last in 1874. In the author's brief preface to the seventh edition, written at Tübingen in 1867 he congratulates himself on the progress that medicine had made since the first edition of his work was written, the prophesies which he made as to the future of medicine being more than justified by the recent progress of events, etc. The author may be excused from congratulating himself. Few men there are like Dalton and the Darwins who are stoic enough to remain indifferent to their own achievements.

Niemayer, did not occur. On the contrary, progress in therapeutics has been continued since the discovery and demonstration of the germ theory of certain diseases. This appears evident by the work on the "Practice of Medicine," written a decade later by the distinguished Osler. It will be interesting to quote Professor Osler's methods of treatment of the same class of cases that we have been considering in connection with the views of Messrs. von Niemayer and Stümpell.

In the treatment of pleurisy Professor Osler says:

> At the outset the severe pain may demand leeches, which usually give relief; but a hypodermic of morphia is more effective. The Paquelan cautery may be lightly but freely applied. It is well to administer a mercurial or saline purge. Fixing the side with long strips of adhesive plaster, which shall pass well over the middle line, drawn tightly and evenly, gives great relief; and I can corroborate the statement of F. G. Roberts as to its efficacy. Cupping, wet or dry, is now seldom employed. Blisters are of no special service in the acute stages, although they eliminate pain. The ice bag may be used as in pneumonia. The general treatment of the early stages should be rest in bed, and a liquid diet. *Medicines are rarely required.* A Dover's powder may be given at night. Medicines are not indicated.[1]

Such a course of treatment for one of the most

[1] *Principles and Practice of Medicine*, p. 569.

critical, painful, and fatal maladies in the middle of the century under heroic dosing with which the physician had to deal is as near the expectant method as could well be. Measures to comfort and relieve pain are all that Professor Osler's system comprehends.

In the treatment of pneumonia, a disease very prevalent in the winter and early spring seasons, attended with great fatality under the bleeding, blistering, and opium practice, Professor Osler's plan of treatment is mostly expectant.

Pneumonia [he says] is a self-limited disease, and runs its course uninfluenced in any way by medicine. It can neither be aborted nor cut short by any known means at our command. Even under the most unfavorable circumstances, it will terminate abruptly and naturally without a drop of medicine having been administered. . . . Under the favoring circumstances of good nursing and careful diet, the experience of many physicians in different lands has shown that pneumonia runs its course in a definite time, abating sometimes spontaneously on the third or fifth day, or continuing until the tenth or twelfth.

We have then [continues the author] no specific for pneumonia. In cases of moderate severity, a purely expectant plan may be followed, keeping the bowels open, regulating the diet, and, if necessary, giving a Dover's powder at night to produce sleep.

In severe cases a systematic plan of treatment should be pursued, meeting the indications as they arise. The first distressing symptom is usually the pain in the side, which may be relieved by local

depletion, by cupping, or leeches—or better still by a hypodermic of morphia. The reproach of van Helmont that "a bloody Molock presides in the Chairs of Medicine," cannot be brought against the present generation of physicians. During the first five decades of this century the profession bled too much; but during the last decade we have bled too little. This is one of the diseases in which a timely venesection may save life. To be of service, it should be done early. In a full blooded, healthy man, with high fever and a bounding pulse, the abstraction of from twenty to thirty ounces of blood is in every way beneficial, relieving pain and dyspnœa, reducing the temperature, and allaying the cerebral symptoms so violent in some instances.[1]

Professor Osler's "Principles and Practice of Medicine" was published in 1892. It is an able and lucid presentation of Medicine in the ninth decade of the nineteenth century, written by a student and teacher of medicine, of lifelong experience; a representative man, well qualified by training and scholarship to speak with all the authority that it is given to finite man to exercise. The same is equally true of von Niemayer and Stümpell, who are as representative of Medicine in Germany as Osler is in England and America. For this reason their views must be received as conclusive in support of the fact of the grand evolution in practice which has taken place, and which is still in progress. One has only to examine the

[1] *Op. cit.*, pp. 529–530.

writings of the great exponents of Medicine in the early part of the century, as Haller, Cullen, and Good, and compare them with the great writers of the fifth decade, such as Copeland, Lee, Dunglison, Ziemsen, Louis, Clark, Pancoast, Gross, Flint, Sen, and many other representative men in the profession of that period, and with those, again, of the closing years of the nineteenth century, to obtain a clear and conclusive demonstration of the truth.

These later writers, be it observed, wrote their great works on the practice of medicine before the discovery and introduction of Immune Medication. Pasteur had, indeed, discovered and applied it in respect of *rabies;* but Lœffler and Klebs had not yet discovered the pathogenic microbe of diphtheria, nor Koch that of tubercular consumption, nor Sanarilli that of yellow fever, as he claimed, etc., with their modifying influence on practice. So important, indeed, were the discoveries as to etiology during the tenth decade of this century, and their influence on theory and practice, as to render the great works on the subject of the previous decade "back numbers." Virchow said in 1878 that if half the medical books of that period were destroyed, the medical profession would not be the loser by it. If it were true then, how much greater is the probability that it is true in 1900.

We have referred to the tendency of the previous period, on the part of surgery, to split up into specialisms. Many physicians prominent

in the profession, among them Professor Martin Paine, of the University of New York, saw only evil in it. But the tendency continued without abatement. It did not confine itself to surgery but infected general practice and the sphere and prerogative of the family physician. It encroached on the domain and the income of that family dignitary, and threatened to undermine his position and influence in the family, where he had been so long honored with the trust and confidence of husband and wife, a sharer in their griefs and troubles, a sympathizer in their sorrows and sufferings, and a partaker of their joys and fortunes. Nothing was more natural, therefore, than that he should regard the movement in no friendly light.

So far as pure surgery is concerned specialisms have been prolific of excellent results. In the practice of medicine we cannot concede so much. The commercial aspect of the matter is not worth while considering. In the diseases of the human mind and body, the expression of which may take endless forms, and, if constitutional, the same malady may involve every organ and tissue of the whole man, the propriety of specialisms becomes questionable, at least. The very able Dermatologist and scholar, Erasmus Wilson, of London, whose work on the "Diseases of the Skin," the fifth edition of which was published in 1862, is a classic, has seriously considered the bearings of this subject. In this great work, he writes:

The same great mind that taught us the importance of recognizing the constitutional origin of local disease [referring to Hippocrates] also impressed upon us the delicate handling of the local disorder, whether proceeding from a constitutional or a local cause. That certain diseases obviously proceed from a local cause, and are in their essence local diseases, and independent of constitutional influence, is the natural inference to be drawn from the foregoing prolegomena. This truth has been strongly impressed upon us by the celebrated Dermatologist of Vienna, Hebra. Many cutaneous diseases which in this country, and with our humoral tendencies, we should be led to treat by constitutional, as well as by local means, Professor Hebra would treat by local means alone; and the great success of his treatment leads us to inquire at what point between the two extremes the truth lies concealed. I believe that our lesson will be best learned by devoting more attention than heretofore to local treatment, and not less to constitutional treatment. The great excellence of the treatment of disease in England depends upon the proper appreciation of its almost universal constitutional origin.

Referring again to Professor Hebra, whose great work on Dermatology entitled him to all the honor he received at home and abroad, Professor Wilson continues: "He is too sound a physician to reject constitutional means; but he declares that they are much less needful than is believed by us; and that a very considerable number of diseases are local in their nature, and may be perfectly cured by local remedies."[1]

[1] Preface, p. xi.

The skin is an important organ of the body and endowed with the important functions of inhaling and exhaling, on the harmonious relations of which human life and health depend. There are, as Wilson observes, diseases of the skin without constitutional significance, such as the parasitic; the local effects of unsanity, the effects of burns, bruises, heat and frosts, chaps and scalds, adventitious growths, warts, nodes, calluses, etc., but in general it may be said that one who knows only skin diseases is not qualified to treat them.

The physiology of the skin is pretty well known, but its pathology being more intricate, is less known, and constitutes, therefore, a special branch of study. Hence has arisen the dermatologist and the Chair of Dermatology in our medical colleges. It is ranked least among medical studies, but it is of a truth one of the more important departments of medicine, and requires powers of research of the highest order. The medical student with a good memory may easily learn the nosology of the skin, the genera and species of its disorders; but to comprehend their significance requires observing powers of no mean order.

The distinguished author of "Diseases of the Skin," Dr. Erasmus Wilson, merits a passing notice. He was born in London in 1808, educated for the profession of medicine, and became instructor in Anatomy. In 1842 he published the best work on that subject that had appeared from any source. Wilson was an indefatigable student,

and a most conscientious writer. All his works, of which Anatomy was the first, show painstaking scholarship. His great work on "Diseases of the Skin" had no superior. It was a masterful production at that day, 1862, showing familiarity with the writings of the masters on that subject who had preceded him in all countries; and while treating their opinions and practice with respect and deference, set forth his own views judiciously and with force and originality. Both of these works passed through several editions and were very generally adopted as text-books in the English and American Colleges of Medicine. Dr. Wilson died in 1890.

Professor Wilson presents the subject, so far as specialism in diseases of the skin is involved, wisely and in good form; but there are other specialisms which have to deal with local diseases other than the skin specialism. There is the throat specialist, the neurologist, the rheumatoidal, the gastro-enteric, the genito-urinary, etc., etc., in justification of which the argument of Professor Wilson applies with equal force and pertinency. The abuses which grow out of them are as likely to follow the practice of one as another.

The observant student of medicine of mature years cannot be blind to the evils which are likely to follow—do follow—in the trail of the specialist. We would not impugn his motives, do not impugn them, for we know as a rule they are above suspicion. Nevertheless, the effect of

the study and practice of a specialism tends insensibly to dwarf the judgment, and distort the vision of the practitioner. This fact is sufficient to deter many men for personal reasons to avoid it—so sensitive are they to influences that may warp the judgment. The specialist is apt to see things through a restricted point of view,—a medium purely his own, and more than likely to confine his observation of causes to the narrow field of vision with which he is the more familiar. The ophthalmologist, for example, is apt to look to errors of refraction for causes of headaches and for a number of ailments of a nervous character, and often prescribes glasses for them with the greatest assurance. Sometimes he is right; as often he is wrong. A certain well-known eye-specialist of New York made a fortune in treating headaches and neurasthenia through the aid of glasses of a peculiar kind and of expensive make. He was totally ignorant of Neurology. He benefited many cases, nevertheless, it must be admitted; in many others he signally failed. The failures he did not count, nor allow them to shake his confidence. Another well-known oculist and a man of ability—a one-sided ability, made so by his limited areas of study—claimed that he had cured epilepsy with certain glasses or prisms. The learned superintendent of an institution for epileptics in the State of New York,[1] was induced

[1] Craig Colony for Epilepsy—W. P. Spratling, M.D., Medical Superintendent and Manager—Since resigned.

to place at his disposal a certain number of epileptics to experiment upon—the poor and unfortunate being always subjects of experimentation for the benefit of science—as long as he desired. The specialist had a number of cases under observation several months. The result was nil. The disease was not even ameliorated in a single patient.

The Neurologist is inclined to exaggerate the scope and influence of nerve-causation in a large range of diseases to which the nervous system is only indirectly related. In this particular, he is more likely to be right than wrong. Still he overstretches his limits when he attributes eczema and articular rheumatism to nervous derangement, or gastro-enteritis and jaundice to disturbance of the nervous function. Man is a unit, of course, and the sympathy of one part involves all the parts, more or less. Still, unless all classifications of medicines and morbific causation and their remedies are to be given up or ignored, the lines of distinction in vogue must be kept intact.

Herein lies the chief danger to the dignity of medical science from specialism. After all it is more in the character of the man who practices a specialty than in the specialism itself. If the specialist in any branch of medicine were an all-round, well-educated man in his profession, the objection urged against it would lose some of its force. Poor human nature is at fault. One is so easily swayed by selfish motives of one kind or other,

either the pride of opinion, or the love of money, or fame, or glory. Few men possess mental poise and balance to a degree sufficiently strong to be able to rise above the influences of their environment, or the entangling interests in which their lot is cast at least, not altogether.

The raw meat fad was launched in this decade which it would not be worth while to mention but for its success, financially speaking, in the treatment of nervous affections. A physician, well educated and reputable in other respects, appeared in New York from the West and opened an office there and announced his mode of treating the ills of the flesh with raw beef finely scraped, of which the patient was required to eat from two to three pounds *per diem*, drinking only hot water, and abjuring all other food absolutely. The doctor maintained that the cause of disease in this generation was anæmia. Before prescribing for the patient he took a drop of blood and put it under a microscope to demonstrate the hypothesis of anæmia. Of course, all were alike anæmic, the light and the dark, the blond and the brunette, the lean and the fat, the plethoric and the depleted—and all were treated alike, and had to pay alike the fee. The doctor's name was Sallsbury. He won a large following and amassed from his dupes a fortune—within a few years. Then he passed out of public mind and memory, to his credit be it said, without establishing a new school of medicine to perpetuate

his fame! Had he been born in the classical period he might have dignified his method as Raw-beef Therapeia, or founded a system of medicine under the cognomen of "Karnopathy." Fortunately his ambition was for money rather than fame.

Human nature shows its humble origin. Whoso thinks that the masses of mankind are far removed from the plane of the anthropoid ape in mentality, or cerebral or cranial development, is in error. There is no fad or fake, or phase of medical or theological belief, so silly, absurd, or irrational, in theory or practice, that it may not gain a multitude of adherents in any large city or community in Christendom.

The trend of things, however, is neither produced nor checked by reason or argument. Specialism was the manifest trend in every department and branch of medicine in the seventh and eighth decade, and in all the industries as well, rightly or wrongly; it was inevitable. It was a movement which, like other movements, proceeded along the lines of least resistance. It involved the principle of the division of labor: that an individual who confined himself to doing one thing, could do it more quickly and better than one who did a variety of things, and consequently was expert in none. The character of the individual was sacrificed, or subordinated to the quality of his achievements. The world wanted experts, rather than men, and the want had to be

met in medicine as well as in other branches of business—for a business, rather than a profession, Medicine, like Law, seems likely to become.

The invention, in this period, the eighth, of the laryngoscope by Czermak, and the ophthalmoscope by Helmholtz, gave a great impetus to the study of the diseases of the eye, throat, and ear. If it were not for these ingenious instruments our knowledge of the morbid anatomy and pathology of those organs of special sense would have remained in a crude undeveloped state, and there could have been no science of Ophthalmology or of Laryngoscopy, or Aurology, and consequently no specialism in these branches of medicine. The invention of the Cystoscope by Nitze, a very useful instrument, followed considerably later. All these instruments were indispensable to physical diagnosis of diseases, or the organs which they involve.

The genius of Brown-Sequard exerted no inconsiderable influence on the practice of medicine in this period. Sequard was born in 1818, of a French father and an American mother, and began the study of medicine at Paris at an early age. His researches on the blood and animal heat gained him recognition. The French Academy of Science awarded him several prizes for his discoveries, and in 1869 he was given the Chair of Physiology in L'École de la Médécine, Paris. He was a warm advocate of potassium bromide in the treatment of epilepsia, in large

and repeated doses, even carried to the point of bromidism, and reported cures from the drug that other physicians have not been able to verify in their own experience. At the age of seventy-five, he advanced a cure for senility in testicular fluid, having himself been much rejuvenated, he claimed, by its use. Being advanced by so high an authority as this French savant, the profession very generally made haste to test the vaunted virtues of the new specific, and the truth or fallacy of Sequard's theory. The results of clinical studies failed to substantiate that author's claim. Sequard's deduction rested on insufficient data, clearly, for he died not long after announcing his supposed discovery—conceived by senility, for senility. But it had the effect of arousing the medical mind to the possible value of animal extracts for nervous derangements, such as brain extract, extract of thyroid gland, the ovary of animals, etc. Extract of the thyroid was at one time largely exhibited hypodermically in various disorders of the nervous system, and in certain forms of brain affections, with reports from certain quarters highly favorable. Nevertheless, its use declined in the course of a decade and is mostly abandoned (1900).

The advancement of medicine in this decade was along the lines of discovery of morbific causation. The illustrious Pasteur was dead, but his work was taken up by a worthy representative in his son-in-law, the distinguished Metchnikoff.

The demonstrations of Pasteur led him to believe that all infectious fevers were due to living micro-organisms. That belief, so positively announced, produced a profound impression on the professional minds of the rising generation, and inspired them to new and independent investigation. Heretofore the field of research had been confined to objective observations—the contagions, such as yellow fever, cholera, diphtheria, etc.; now attention was also given to subjective infections, infections generated within the human body, and termed auto-toxæmia, or self-infection. Professor Vaughan of the University of Ann Arbor was the first of the early writers to discover the subsistence in the bowels of ptomaines, as a cause of acute indigestion, or cholera-morbus, of which so many persons of robust health suddenly die. The ptomaine is a deadly microbe, and may be taken into the system by eating infected flesh or fish, or defectively canned vegetables; but its most common origin is in wholesome food itself. Eating a medley of things containing incompatibles, may produce the deadly poison, or toxæmias. This discovery led to a revolution in the treatment of such maladies. It uncovered a cause which for ages had been concealed from mortal view. The indication of treatment was elimination, and disinfection of the intestinal tract. It called for copious exhibitions of diluent fluids, mucilaginous or albuminous, with a minimum of brandy, and the absolute abstention from food, since in

such a condition food would but "add fuel to the flame." The indication of treatment is to replace the loss of the serum of the blood with pure water in some form as fast as the patient can take it, and let depletion through the bowels go on. The old-time astringent measures, as opium, camphor, bismuth, etc., are contraindicated so clearly that the oldest fossil in the community has been compelled to admit it. Subsequent discoveries in this direction prove that many forms of indigestion with its long train of distressing symptoms, so frequently attended with heart failure and death, are more often toxæmias, due to errors of fermentation in the bowels, by which gases are produced rapidly and in great quantity. The advance in these studies reveals the intimacy that exists between the brain and the gastro-enteric system, and uncovers another source of causation of these maladies.

These distressing complaints were formerly treated with antacids, charcoal, bismuth, pepsin, pancreatine, cholestrin, etc., each in turn, until the resources of the pharmacopœia were exhausted. The case was then sent to a specialist as one of nervous dyspepsia, and, failing there, turned over to the Osteopath, and from him to the Christian Scientist, to be persuaded that there was nothing the matter with her or him.

Such cases of gastro-enteric disorders have always been very prevalent in Christendom, and the cause of great mortality of infants and chil-

dren. It was and still is customary to trace them to dietetic errors, extra nutrition, stimulation of the appetite to take more food, in greater variety, and of unwholesome and incongruous character, than the need of the organism requires, the excess producing debility and disease. This is a fruitful cause, no doubt,—a direct exciting, efficient cause; but there are other causes for such derangements which involve the brain and through the ganglions of the chylopoietic system, produce a still larger train of nervous symptoms. It is from this class of patients that the asylums and sanatoria are largely recruited. The more efficient means of treatment afforded by such institutions, led to the establishment of private hospitals and sanatoria. The introduction of such remedial agencies as hydrotherapeia, electrotherapeia, massage, sun, air and water baths, gymnasiums, diversion and amusement, indoors and out, made sanitoria a necessity. They revolutionized medical practice in chronic cases. So attractive were these private institutions for the treatment of nervous cases and of persons who had contracted the opium, cocaine, and alcohol habit, and so profitable, that the phenomena of water-cure, of which we gave a brief account in connection with the middle period, were repeated, and repeated on a larger and more pretentious scale. Many of them were conducted along strictly scientific lines and upon principles laid down by the best approved writers on dis-

eases of the nervous system. On the other hand, many of these sanatoria were of the nature of fake establishments, conducted by an undiplomaéd pseudo-doctor, who confined the use of medicine to the dinner pill, a generous table, well served, bathing facilities in various forms, with provisions for amusements, etc. The proprietors of these fake institutions made bold to advertise them in the daily papers, medical journals, and in the monthly literary magazines—beautifully illustrated. The only way the public could discriminate between the specious and the regular medical sanatoria was this peculiarity: one advertised, the other did not.

The hypercritical reader may feel disposed to ask if this enlarged scope of Therapeutics was Hippocratian. No one need to be in doubt on that subject. The use of electricity, magneto, and static, in medicine followed long after the discovery of Galvani and Mesmer, more than a century since. Its therapeutics was accordingly unknown to the Sage of Cos, as were also many remedies of known medicinal virtues which have recently been discovered. It is not likely that Hippocrates would have declined to recognize them. One should bear in mind that the master studied *the indications* in cases of disease, and rigidly followed them, making use of all the means and methods to that end which he knew, or which were accessible. It is reasonable to suppose that he would have profited by discoveries in Therapeia.

Every physician who follows that course is an Hippocratian, be the remedy or means employed what they may, the dictum of this school or that to the contrary, notwithstanding.

It is worthy of mention that at the close of this period the sectarian spirit in the profession was passing. The bitterness which had long subsisted between the schools of medicine and their members was subsiding. In the middle period of the century it was intense and led to no little discourtesy, not to say rancor. The old-school journals declined to recognize the new-school journals; to the credit of the new-school editor, the latter did not follow the old-school editor's example, but welcomed and read their literature. Formerly the members of the schools would not recognize each other socially. A story is told of two physicians of opposite schools meeting and being introduced at a reception. One said to the other: "I am pleased to meet you as a gentleman, but not as a physician"; the other retorted: "I am glad to meet you as a physician, but not as a gentleman." The exhibition of bad feeling was not always so dignified.

The lines between the two schools, however, were slowly being broken down. Consultation between their members was not uncommon. The homœopath was dropping the "trade-mark" from his sign and his professional card. The practice of the two systems was drawing nearer and nearer together: The homœopath was giving

a good deal more medicine; the allopath was giving a good deal less. The lancet was but little in evidence, except in certain emergencies, when members of either school would employ it. Leeches were nearly out of date. Each party carried his little pocket case of hypodermic tablets, and other preparations, in tenth, twenty-fifth, and one-hundredth grain doses—usually alkaloids. Each gave calomel in quarter grain doses, and castor oil and other laxatives in effective doses, be they more or less. In fact, there was nothing in the procedure of the two schools, at least on the part of a large number of their members, such as were educated and of good standing, to bar their social and professional affiliation—except tradition. The interest of each would manifestly be promoted by medical union. Each could make a bonfire of three fourths their medical books, with no disadvantage; tear down, shut up, or turn over to other and more useful purposes most of their college buildings, and neither be any the loser thereby, but on the contrary, greatly benefited. Disunion is maintained at a fearful disadvantage to both parties. It would seem wise on the part of these schools to follow the course of Trusts and other corporate bodies, and merge their resources. The Trusts find it profitable; the medical schools would find it equally so. Such a procedure could not fail to exalt the standing and dignity of the profession; the interests and ambitions of persons alone would suffer by it—for a generation only.

But a wiser and more radical policy would be to turn over the medical colleges to the Universities of the State. With the growth of the collateral branches of medicine the State alone should provide means for their study. The education of physicians should not be left to private corporations as a business enterprise, to be conducted on business principles. It would appear that the evils growing out of the present system could readily be corrected under State management, and that they must increase under the present policy.

There is not a distinctly Homœopathic School of Medicine in Europe. In Paris the homœopaths have a medical society and a hospital—a small one. The French law forbids any physician to dispense his own medicines, except in emergency cases. Germany has a similar law. England is more liberal in that respect toward both classes of physicians. The homœopaths have long had a medical society of their own and hospital in London, but no medical college. On the other hand, the United States of America have homœopathic medical colleges that may be counted by the score. The colleges of either school could supply the Anglo-Saxon world with all the physicians it needs.[1]

America is the breeding ground for ill- or half-conceived ideas. Any new cult, fad, or fancy spreads like a contagion and infects the minds

[1] See Mr. Abram Flexner's opinion on this subject on p. 51.

of people who are rated as intelligent—and they are intelligent according to the American standard, the only practicable one, that of being able to read and to write. A better test or gauge of intelligence would be common-sense. The application of that test would, we fear, find the average American below that of the middle class of Europeans. With the larger liberty accorded the American citizen, he assumes the privilege to exploit his pretentions to discoveries, in religion and medicine particularly, wherever he can get a hearing. With Yankee shrewdness, an individual with cheek and push and loquacity may gain a multitude of listeners. The most specious, puerile, and irrational claim to a new discovery, so long as the cheat cannot be readily exposed or disproved, will be received by a host of people without question, who will put up their money, often their last dime or dollar on it. The sharper finds among this class of semi-intelligent people a multitude of fallow minds on which to prey and win a fortune. Nor is there any law against it in any democratic community, and the people would resent it if there were. Such things could not be done in France, Germany, Italy, or England. They ought not to be tolerated here. People who cannot protect themselves against frauds and charlatans, religious or medical, should have less freedom and more governmental protection, not only against the sharper, but against their own weakness.

In concluding this chapter we have to remark the continued trend toward Expectant Medicine in the treatment of all diseases for which a specific has not been discovered. The disciples of Hahnemann would, presumably, resent this imputation if applied to them. But in all candor we do apply it to them, and appeal to the common-sense of the physician to decide if the treatment of, say, a case of typhoid, for which no one will have the presumption to claim a specific, by the administration of doses of any medicament, attenuated or otherwise, watching the results meanwhile, and changing the "remedy" a score of times in as many days, is not expectant medication. If it be not that, we confess that we do not know in what category to place it, unless it be that of the Faith-curist. It is self-evident that no single, uncomplicated disease could have a score of specifics.

The germ theory of infectious and contagious diseases had taken strong hold of the professional mind. Further germs had been discovered and isolated, since the discovery by the distinguished Pasteur of the germ of rabies and the method of its culture for the treatment of hydrophobia. The genius of the profession was on their track. Loeffler and Klebs, both of Germany, in this decade discovered the bacillus of diphtheria, and, following the method of Pasteur, made cultures of the germ, and was reporting gratifying and satisfactory results from its use. On this side the Atlantic the culture was called antitoxine, or horse-serum,

because the culture was obtained by inoculations of the horse, the method of which is too well known to be described in this place. As it was natural to anticipate, there was strong opposition in America to the use of horse-serum for the disease, not only by the Hahnemannians, who resolutely maintained that their success with the dreadful scourge under their method was all that could be reasonably expected, but by many physicians of the dominant school as well. The success of the new remedy, however, soon won its way to public favor. A fatal case of diphtheria under antitoxine, if its administration was not too long delayed, was rarely reported; recovery from the disease was as certain under its use as was recovery from the simpler maladies. In the discovery of the diphtheria germ by Loeffler and Klebs, both at the same time, the one in Berlin, and the other in Vienna, two more names were added to the list of immortals.

SIXTH: PERIOD OF THE NINETEENTH CENTURY

CHAPTER XX

(*NINTH DECADE*)

Progress of Psychological Medicine

RESEARCHES in the domain of brain and mind had been overshadowed somewhat by the momentous discoveries in Pathology and Therapeutics. The aversion which men of science felt in the early century of antagonizing public sentiment on the subjects of faith and belief of Christendom became less puissant an influence against investigations in the middle of the century. Indeed, it had ceased to exist, in good part, since they saw the facility with which ingenious theologians could adapt interpretations of the Word to the truths of science.

Germany had led the world in the studies of brain and mind, in health and disease; and the first systematic work on these subjects along scientific lines was written by a German,—Wilhelm Griesinger, Professor of Clinical Medicine and Mental Science in the University of Berlin, and the ac-

knowledged leader of the modern school of German Psychology. We are indebted to the learned Drs. Robertson and Rutherford, of Canterbury and Edinburgh, for an excellent English translation of this great work on Mental Diseases, and for its publication, to the New Sydenham Society of London.

Wilhelm Griesinger was born in Stüttgart, July 29, 1817. For some years he was director of the Medical School in Kassel Ain, and President des Conseil de Sant for Egypt. Later, he held a professorship at the University of Tübingen. His death occurred at Zurich, 1868.

Professor Griesinger approached the subject of diseases of the mind and brain from the Hippocratian, or rational point of view. He had little patience with the Metaphysical School, which was prominent in his day, led by Heinroth and seconded by Langermann and his pupil Ideler, who would turn the insane over to the Ecclesiastics, holding that the religion of Christ was a specific for their malady and a preservative against it. Heinroth, 1773–1843, was a man of learning and of much force of character. He exerted a strong influence over the metaphysical side of mental therapeutics which is not yet extinct.

Professor Griesinger was decidedly of the Somatic School, and must be regarded as the pioneer in the development of medical psychology. It was a subject evidently very near to his heart. A copy of the second edition of his

work, published in 1861, is before us. In it he is particular to state in the brief preface that the first edition of it appeared in 1845, and to claim priority to views since set forth by other writers on the subject as their own, which may be found in his first edition. He does not like to appear in 1861 as borrowing "ideas and doctrines, the arrangement and examples contained in it [this last edition], which they have even taken, without restraint as their own, simple excerpts of whole sections."[1]

The quality and bent of the author's mind on his great theme is well shown in the preface, a few lines from which we have quoted above. He writes at Zurich in 1861, as follows:

In Tübingen, for upwards of ten years, I regularly delivered lectures upon medical psychology, in conjunction with my principal subject, and as often as opportunity afforded, admitted cases of mental disease into my clinique, making them like any other disease, the subjects of clinical instruction and discussion. The advantage of this is so apparent that I live in the hope that very soon the establishment of regular psychological cliniques will become general. It is through these that the proper idea, the purely medical idea [better say scientific idea] of mental disease, conjoined, however, with a knowledge of the morbid mental symptoms, can first receive that general extension, so very desirable, whereby mere asylum managers can no longer call themselves medical psychologists, whereby that fantastical bombast sounding

[1] Preface, p. ix.

of the spiritual world, which is still sometimes apparent in psychological literature, will soon give way to temperate, clear, medical observation.[1]

This clear-headed author may not doubt the existence of a spiritual world, but whether he does or does not, he regards it unbecoming for a man of science to deal with matters of which he knows nothing and can know nothing. Like many others, he prefers to take up that subject when he gets there, and for the present to confine his observations to the realms of the sensible.

Griesinger's great work was written, as we have seen, in 1845; it could be read to-day with profit, we venture to say, by the most advanced student of mental science. He wrote with precision and logical coherence, of things he knew from personal observation and experience, and with familiarity with the facts and discoveries of contemporaries engaged in the same department of research as himself—and with full and adequate scholarship. One fails to find in a single paragraph, in a work of nearly six hundred closely printed octavo pages, part of which is in unleaded brevier type, a single paragraph in which a close, painstaking student and high grade scholarship, so characteristic of the German author, are not apparent. Many modern writers on the subject would suffer compared with Griesinger.

Many writers on diseases of the mind, of an earlier period, insisted that insanity, or mental

[1] Preface, p. viii.

derangement was not due to brain disease at all; that post-mortems of insane cases showed no brain lesions. A conclusion, so manifestly erroneous, must have been based upon faulty or insufficient observations. "Pathology proves as clearly as physiology," says Griesinger, "that the brain alone can be the seat of normal and abnormal action; that the normal state of mental processes depends upon the integrity of this organ; and that both together are influenced by the state of the other organs in disease."[1] And elsewhere he declares that the physiological and pathological facts of deranged mental functions prove unmistakably that the brain is the organ involved; "we, therefore, primarily and in every case of mental disease, recognize a morbid action of that organ."[2] Again he writes: "Insanity being a disease and that disease being an affection of the brain, it can therefore only be studied in a proper manner, from the medical point of view. The anatomy, physiology and pathology of the nervous system, and the whole range of special pathology and therapeutics, constitute preliminary knowledge most essential to the medical psychologist."[3] And again he declares with italicized emphasis, "that the most important and most constant changes in the brain of the insane consist in diffuse diseases of the external layers of the corti-

[1] *Mental Pathology and Therapeutics*, p. 3.

[2] *Ibid.*

[3] *Ibid.*, p. 10.

cal substance—that is, of the surface of the brain and of the membranes enclosing them."[1]

Such views are self-evident and undisputed in 1900 A.D., but they were not altogether so in 1850, and it required a man of courage and strong conviction to declare them.

Griesinger was not, however, alone in holding the doctrine of the mental dependence of brain and mind. Flourens and Despine in France were teaching the doctrine, and Pflüger and Ecker and his distinguished contemporary, Schroeder van der Kolk also, upon data that were absolutely demonstrable. Van der Kolk was among the great brain anatomists and pathologists of that period. He "does not remember during the last twenty-five years the dissection of an insane person who did not afford a satisfactory explanation of the phenomena during life. . . . On many occasions," he says, "I was able accurately to foretell what we should find."[2]

The earlier mental pathologists, who did not always find brain lesions in insane subjects, may have erred by reason of faulty means of examination and imperfect knowledge of the minute anatomy of diseased changes in the brain substance. Griesinger, himself, pointed out this source of error:

We may consider [he says] how easily many minute and important changes—even exclusive of those

[1] *Op. cit.*, p. 44.

[2] *Vide* his *Minute Structure and Function of the Medulla Oblongata.*

which are only microscopically appreciable—may elude mere ordinary attention; and we ought, as a rule, to accept statements regarding the normal or abnormal condition of the brain from those only who, by the spirit of their writings, show that they are acquainted with pathological anatomy, that they acknowledge this preëminently, and that they know what is to be looked for and what to be esteemed.[1]

The skill to make correct observations of minute morbid anatomy of any tissue requires exact knowledge and long experience. The trained pathologist alone is equal to it. In regard to the brain such skill was imperfect in Gresinger's time; and he looked forward to a time when "greater accuracy could be achieved, and greater results from still more searching and minute investigations in the future." How often have we known investigators of pathological anatomy to differ, for want of knowledge, as to the nature of specimens submitted to them for examination!

Dr. Henry Maudsley, of London, physician to the West London Hospital, followed the eminent Griesinger, Schroeder van der Kolk, and others in support of Griesinger's doctrine, in his excellent contribution to the subject of "The Physiology and Pathology of the Mind." His work can hardly be called a treatise; but it is an interesting, extended essay of advanced thought, illuminated by the views of contemporary writers of France and Germany. Maudsley was early indoctrinated

[1] *Op. cit.*, p. 409.

Henry Maudsley.

Photograph by Jerrard.

in the Metaphysical School of mental science, which rested solely on theoretical data; and when he first applied himself, he informs us, to the pracal study of insanity, he was surprised and discouraged to find that the theoretical knowledge which he had acquired, "had no bearing whatever . . . on the facts that daily came under observation"; and that "writers on mental diseases . . . treated their subject as if it belonged to a science entirely distinct from that which was concerned with the sound mind."[1] In other words, they treated deranged psychic phenomena as if they had no relation to brain function and were to be turned over, therefore, to the influence of moral and religious agencies.

Despine, an eminent physician of Marseilles, of that period, published his treatise on *Psychologie Naturelle* in three volumes, with the object of uniting and harmonizing the two systems of mental philosophy, the metaphysical and the physiological. His contribution to the subject is most learned and scholarly. While he respects the division of the mind of the Metaphysical School, which is retained even to this day by our theological seminaries, he recognizes their foundation in the brain—the white and gray substance.

Que les manifestations psychiques dependent de l'organism, non est plus incontestable. N'en avons nous pas la preuve dans la transmission des ascendants aux descendants pas hérédité organique, des

[1] *Physiology and Pathology of the Mind.*

diverse activités de l'ésprit, lorsque la loi hérédité intervient pour donner à l'homme ses facultés psychiques? Il n'est pas moins incontestable que l'organe qui a specialment la fonction de manifester l'âme et ses facultés, est le cerveau, et uniquement le cerveau.[1]

The learned author was not emancipated from the trammels of the metaphysical philosophy, and everywhere keeps brain and mind distinct and separable as a philosophical concept. Referring to the brain he observes:

Cet organe nerveux a la noble fonction de manifester l'âme, le moi, l'ésprit la personalité d' étre avec ses facultés intellectuelles et ses facultés instinctives. [And he asks] Si l'est la cause instrumental necessaire à la manifestation de l'àme est il la sèige de cet étre immateriel? Question oiseuse [he says] parce que nous n'avous pas les moyens de la resoudre. . . .

The significance of the phenomena of brain diseases and brain defects, and inequality of development in individuals were problems to solve which gave the author and his confrères no little embarrassment. He quotes a paragraph from the distinguished Cruveilhier, translated from "Traite d'Histologie" of M. Béclard, which shows that that author was suffering from the same embarrassment:

L'étude du cerveau dans l'idiotic, se rattache aux

[1] *Tome premier*, p. 443.

plus graves questions psychologiques, et en particulier aux différences intellectuelles que existent entre les hommes; diffèrences non moins remarkables, non moins nombremes, non moins appreciables que les diffèrences physiques. Or ces diffèrences intellectuelles sont elles liées à ses differences d'organisation du cerveau?

M. Cruveilhier implies that there is but one answer to that question. He says:

L'observation me parait reproudre par l'affirmative, la saine metaphysique ne sauvait repousser les conquêtes de l'anatomie. Les vèrités physiques ne sauvaient étre en apposition avec les vèrités metaphysiques et morales. Le règne animal tout entier, les lesion physiques et organiques du cerveau, sont la pour deposer en faveur de l'influence de l'organism sur l'intelligence.[1]

This is a fact which the metaphysicians are slow to recognize. A full knowledge of the brain in health and disease, of the normally developed brain and the defective or abnormally developed brain, cannot fail to answer the query raised by M. Despine, and to revolutionize the moral, intellectual, and religious philosophy, which was founded in darkness, or in the absence of this knowledge, and which must collapse and disappear before the light which that knowledge throws upon the subject. The truth or fallacy of the doctrine of immortality has nothing to do with it.

[1] *Op. cit.*, p. 445.

The phenomena of partial idiocy are of profound significance in this connection. The Zerah Colburns have been numerous, who knew nothing but mathematics; and the Combes, who knew everything but that. The celebrated pianist, Blind Tom, as he was called, was idiotic save in music, in which he was an unusual genius. The phenomena of monomania, or disease of a single organ, or brain centre, possess a like significance. The miser, the kleptomaniac, the word-monger, certain homicides, the paranoiac, etc., are examples of disease of a single mental centre. Again there are cases in which groups of mental centres are alone abnormal, as religious mania, while the other centres are normal, etc. These anomalies of the mind have always been an inexplicable problem to the metaphysician. Special brain centres of independent function afford the key to solve the mystery.

It is a fact worthy of being noted that the trend of philosophic thought has been, during all the century, particularly the last half of it, away from the metaphysic and abstract and toward the scientific and demonstrable. Metaphysics may serve the man of leisure to amuse and kill time, who is content to take things as they are and cares not to trouble himself with the why and wherefore; but it will not do for a man of action as well as thought; nor for an age where the spirit of inquiry prevails, in which the reason for things is an object of inquiry, and the love of truth is supreme. "I think, therefore I am," is a phraseology that will

do for the student of Kant or Descartes, but it will not satisfy the Galls and Hunters, the Béclards, Eckers, Hoeckels, Darwins, Huxleys, Crooks, Pasteurs, Klebs, and a growing multitude like them, who must seek a closer intimacy with final causes. They are not satisfied with the abstract proposition, I know, I think, I feel, I see and hear; they must know the process of these mental acts and find out the mystery of the how of these self-evident propositions. And the closer they come to the depth of any of these processes, the nearer they find themselves to the secret of the Infinite,—in the presence of the marvellous, the grand, the sublime. The human eye and the mechanism by which it correlates solar vibrations into light, or vision, constitute a science of itself of vast scope. The same is true of the human ear and its apparatus by which atmospheric vibrations are correlated into music. Its field of research is vaster and more intricate, if possible, than that of the eye. Neither could perform the marvels it does, with all its infinitely fine mechanism, but for an infinitely finer nerve apparatus in the brain known as the nerve centres of vision and hearing, the thalami-optici and the aural ganglion. The metaphysical observer says these are *the instruments* of hearing and seeing; they are, rather, the source of those powers;—without them, light and sound would not exist. In fact, there could be no such thing as illumination without the thalamus, nor of sound in the

absence of the aural ganglion—not even a sense or idea of light or of a tone. Are they then instruments of these things? or are they their source, or the *esse* itself?

When it comes to the secret of sensorial impressions, of thought and feeling, the beautiful, love and sympathy, reason and knowing, memory, conscience, faith, charity, sublimity, etc., the inquirer is led into a yet larger field of mystery. He has traced sense impulses and perceptions, and ideo-mental and motor impressions to their fount, or brain centres where such things are correlated into their respective ideas and feelings and actions, but there he halts; there he is left to indulge in hypotheses concerning the powers of correlating brain substance—by a mental alchemy, similar to the conversion of atoms of matter into electrons—into the varieties of psychoma—Mind! He knows thought wastes the brain; that by the destruction of brain cells mental processes are carried on. So much is demonstrable; but the how is as yet an inscrutable mystery and involves a problem more befitting a work on philosophy than of history.

But to the exact, the demonstrable, the scientific, we repeat, is the trend of the nineteenth century. It is a trend that gains force and momentum with each discovery in physics and dynamo-physics. He would be a bold Transcendentalist who would predict the end to which it will lead, or the results which it is to accomplish.

On the interesting subject of metaphysics we will conclude with the opinion of Dr. Henry Maudsley, writing upon a similar theme:

Two facts come out very distinctly from a candid observation of the state of thought at the present day (1872). One of these is the little esteem in which metaphysics is held, the very general conviction that there is no profit in it; the consequence of which firmly fixed belief is, that it is cultivated as a science only by those whose particular business it is to do so, who are engaged not in action, wherein the true balance of life is maintained, but in dreaming in professional chairs; or if by any others, by the ambitious youth who goes through an attack of metaphysics as a child goes through an attack of measles, getting thereby an immunity from a similar affection for the rest of his life; or lastly, by the untrained and immature intellects of those metaphysical dabblers who continue youths for life. A second fact, which has scarcely yet been sufficiently weighed, is the extreme favor in which biology is held at the present time, and the large development which it is receiving.[1]

The more distinguished writers of the French School of Psychology at this time had not advanced to the conception of specialized psychic centres in the cortex of the hemispheres, as well as in motor centres. But the researches of German brain pathologists were preparing the way for it. The steady advance in knowledge of brain disease and deformities in the weak-minded and partial-

[1] *Physiology amd Pathology of the Mind*, p. 8.

idiotic, fixed the hypothesis of such plurality of mental centres too strongly on the judgment to be resisted. We have already shown that the doctrine of plurality had been long since advanced in Germany, and advocated by some of the brightest minds in Europe and America. The number of its adherents had much increased in the eighth decade, and was still more numerous in this, being forcibly influenced, no doubt, by certain demonstrations of Munk, Schafer, Fritsch, Hitsig and others of Germany, and of Dr. Ferrier in England with electro-magnetism in locating motor and sense brain centres.

Students of mental pathology and physiology were skeptical in the middle of this century, as we have seen, of the doctrine of a congeries of organs or ganglionic centres in the brain, endowed with, and exercising a special independent psychic function. While no longer doubting that the brain was the organ of the mind, they had no conception of the relation of one to the other. It was their habit to speak, as does Despine, of the brain as an *instrument of an entity* back, or outside of the brain. They came to consider that the brain was an instrument of the mind, and of man, therefore, as a double personality—physical and psychical, not one indivisible and inseparable entitity, of which the objective was physical and the subjective psychical. Does one ask how can this be? We reply, How can it otherwise be? The existence of centres of thought and sentiment with

such a function was inscrutable to them, and is quite as inscrutable to the physiologist of to-day. It is a proposition, however, that forces itself upon the mind, for it is less inscrutable than the existence of thought and feeling without such centres of psychic functions. Its concession is a necessity of logic as well as of fact. Dr. Alexander Eckers of Baden, in his great work on the "Cerebral Convolutions of Man," which was published in the previous decade, gives clear utterance to the doctrine and commits himself to it without reserve:

That the cortex of the cerebrum [he says], the undoubted material substratum of our intellectual activity, is not a single organ which enters into action as a whole with every psychical function, but consists rather of a multitude of organs each of which subserves definite intellectual processes, is a view which presents itself to us almost with the force of an axiom. The opposite hypothesis of a single organ for the multiplicity of the intellectual functions, would mark a standpoint about equally advanced with the abandoned conception of a vital force. If, however, as we think is undoubtedly true, definite portions of the cerebral cortex subserve definite intellectual processes, there is a possibility that we may some day obtain a complete organology of the brain surface—a science of the idealization of the cerebral functions. Such a science, that is, a knowledge of the psychical organs of the brain in all their relations, is certainly one of the most important problems for the anatomy and physiology of the next

century, the solution of which will work no small transformation in psychology.[1]

The prediction of Professor Eckers is in course of being fulfilled. Considerable advancement was made in that direction before the century in which he wrote was closed, through the labors of his contemporaries of Europe and America.

An important contribution to the doctrine of the physical basis of mind was made by Dr. Elisha Sivartha in the seventh decade of this century, in discoveries and generalizations respecting special brain centres of mind and their polarities in the body. Dr. Sivartha accepts the hypothesis of Gall as to the localization of the various organs in the cerebral hemispheres, rejecting his misconceptions in respect of their locations, and adding a number of other faculties, and claims to have correctly localized them. But he has gone further than that: by a long series of experiments and observations, he claims to have demonstrated their polarity in the organs and muscles. He has published a series of charts of extraordinary artistic merit, drawn with his own hand, to illustrate the subject. The unity of body and mind receives strong support in the discoveries and demonstrations—if such they prove to be—of Dr. Sivartha. We shall have to concede to the author the possession of great genius superposed upon an intimate knowledge

[1] *The Cerebral Convolutions of Man*, pp. 7–8.

of the anatomy and physiology of the brain and nervous system. In this achievement the author claims to have established a new science, the science of Mentology, with its roots in the known relations of special brain centres to the somatic centres, the various muscles and organs of the body. In this way the author shows the relation of organic function and muscular motion to the exercise of faculty, and develops the subject in great particularity, even to styles of locomotion, manner of speech, attitudes, gestures in conversation and public speaking—the instinctive movements of the hands and arms even to the motion of the fingers in expression; the working of the facial muscles and the exhibition of the emotions of hate, love, pleasure, fear, grief, anger, jealousy and revenge, reverence, piety, pride, dignity, etc., etc. It will thus be seen that actions have speech as well as voices, and that all beings may converse with each other through gestures. Of course, this is no new demonstration, in a general way, but to Dr. Sivartha must be given the credit of being the first to unfold the rationale of it and to have established a system of Mentology comprehending bodily expression. The conclusion to be drawn from his facts are far-reaching upon mental philosophy. The deduction to be made from them is clear, that the corporal is created by the brain—the forces psychical.

Dr. Sivartha's work on this subject is a most painstaking and elaborate production, well worthy

of a wider publicity than it has obtained. He calls it "The Book of Life"—a title which narrows the idea and scope of the work, and is decidedly misleading. It is really a great work—a serious work—upon the Psychology of Man.

Elisha Sivartha was born in England in 1834, and came to this country at an early age. He graduated in Medicine at Ann Arbor, Michigan, U. S., but has never practised, having devoted his life to study and demonstration in the domain of Mental Science—Mentology.

Dr. W. B. Carpenter's work on the "Principles of Mental Physiology," which was published in 1874 is the latest considerable treatise on that subject with which we are acquainted. It embraces a *résumé* of the knowledge of the brain and nervous system on its normal side down to date. In accordance with that author's custom he confines himself to what the late Professor Virchow termed objective knowledge. He writes for the student of medicine, and deals with facts and well settled principles, giving his imagination, if any he have, no part in the development of his theme, however grand and sublime it may be. The nearest approach to a rise above terra firma may be found in the following paragraph:

The culminating point in man's interpretation of nature may be said to be his recognition of the unity of power by which her phenomena are the diversified manifestations. Toward this point all scientific inquiry tends. For the convertibility of the physical

forces, the correlation of these with the vital, and the intimacy of that nexus between mental and bodily activity, which, explain it as we may, cannot be denied, all lead upward toward the same conclusion —the source of all power in the mind.[1]

Carpenter is a man of pronounced conservative views, and exercises great care so to express himself on points where there are differences of opinion, as to give no offence to either party. Nevertheless, he departs from his usual tolerance toward the hostile attitude of the ecclesiastics to science and scientific men, and rather goes out of his way, in his concluding chapter on "Mental Physiology," to give them a lecture on ethics. To the question so often asked, why men of science are usually indifferent, or hostile to religion, he replies as follows:

In the first place, there has been for several centuries past a constant endeavor on the part of the upholders of theological creeds and ecclesiastical systems either to repress scientific inquiry altogether, or to limit its range. While accepting with the rest of the world those results of scientific labor which contribute to their own comfort or enjoyment—making no objection to science so long as it confines itself to giving them steam-engines and railroads, gas-lighting and electric-telegraphs—such theologians maintain that the minds of men who devote the best powers of their lives to the search for truth as it is in nature, are to be "cribb'd, cabined and confined"

[1] *Principles of Mental Physiology*, p. 696.

by narrow interpretations of the Bible; and now think to put down the great scientific hypothesis which is engaging much of the best thoughts of our time, by citing the text, "God made man in his own image," just as three centuries ago they declared the Copernican system to be a pernicious error, because Joshua commanded the sun and moon to stand still, and even yet denounce Geologists as sceptics, or even infidels because they refuse to accept as revealed truth that God made heaven and earth in six days, and rested on the seventh day. It is not strange then, that men of science should not only rebel against such self-constituted domination, but should repudiate the whole system of belief of which it is the expression.

This forcible expression of resentment from Dr. Carpenter toward the course pursued by the ecclesiastics, while just, is a most unusual procedure on his part. Dr. Whewell, himself a churchman, declares that the attitude of the ecclesiastics "made men of science hate religion."[1]

Dr. Carpenter is the typical plodding student of science. His works show painstaking care and industry. While his sentences may be somewhat prolix, he uses the greatest care to leave no part of his thought to conjecture, but to express it in the fullest manner. This form of literary composition makes his style somewhat stilted; but the fault, if fault it be, is amply compensated for in the matter that it enunciates.

[1] *History of Inductive Science.*

The influence of Dr. Carpenter on the advancement of the science of medicine has been second to few in England. Besides his great physiologies, comparative and human, he has written several minor treatises.

Professor Maudsley's contribution to the art and science of Medicine is considerable; not that he has enunciated anything that was new, but that he has enforced the advanced thought on the physiology and pathology of the mind on the profession, and set it forth with a cogency of reasoning and illustration that makes it appear self-evident. To the care and treatment of the insane he brought a large understanding and a humane heart. No words but condemnation has he for the system and method of treating individuals who had the misfortune to lose their reason through no fault of their own, which, though ameliorated, still merited disapprobation. His suggestions for betterments are judicious and wise, such as the adoption of the cottage plan; keeping mild cases of the insane at home or in private families, and by that means avoiding *herding* them into institutions where the chief classification of them would be male and female. Under the system in vogue it was impossible to give such cases of disease individual treatment, such as is accorded other diseases. Of insanity there are many varieties; rarely are there two cases of any variety exactly alike, and that, therefore, should be treated alike. In large

institutions, this individualization is out of the question; the medical staff is not equal to it. Moreover the expense of providing a corps of physicians large enough to meet the requirements suggested by Professor Maudsley, would be greatly increased, to the policy of which the taxpayers would object. Under the present system, from three to five physicians have the medical care of from five hundred to two thousand patients. From this number of physicians the medical director should be counted out, since, when he is not a mere figurehead, he is either a politician or a medical expert in medico-legal cases which absorb most of his time. The patients get very little of it, and would be no better off in many institutions if they got more. The medical treatment, therefore, is left to the assistants the number of which, as we have said, is totally inadequate to prescribe anything better than *secundum artem* treatment.

Against this system Professor Maudsley inveighs with all the force of his logic, which, however, since the appeal was to the profession which has not supreme control in public matters of this kind, has had little effect, other than to enlighten the mind of the profession on the subject. Customs that are long continued have all the authority of constitutions and statutes. They can only be changed or reformed, if evil, by a change of public sentiment; and when that is effected another impediment to reform, almost

equally potent, is encountered in "vested interests." Who can estimate the power of these to the progress of society?

Dr. Maudsley's latest contribution to Medicine is his "Responsibility in Mental Disease." Of the influence of this work, the observations which we made on his suggestions for the better care and treatment of the insane are equally applicable here. The work is a masterpiece of its kind. The author keeps steadily in view the relation of cause and sequence in treating the subject. He traces to their origin the lunatic and the criminal, and finds that both are products of abnormal conditions created and fostered by the social régime; that they are generated under conditions that could produce nothing better; that they are victims of faulty environment, which they did not create, nor had any hand in the making; that they are being punished, therefore, for sins and crimes not their own but of others. Maudsley logically maintains "that lunatics and criminals are as much manufactured articles as calico-printing machines and steam-engines"; that the failure to connect the two is due to our faulty or narrow understanding.

They are neither accidents nor anomalies in the universe, but come by law and testify to causality; and it is the business of science to find out what the causes are and by what law they work. There is nothing accidental, nothing supernatural in the impulse to do right, or the impulse to do wrong; both

come by inheritance, or by education; and science can no more rest content with the explanation which attributes one to the grace of Heaven, and the other to the malice of the devil than it could rest content with the explanation of insanity as a possession by the devil.[1]

All students of mental pathology who have had a large acquaintance with subjects—say, rather, victims—of brain disease and brain deformities, recognize the truth of the foregoing proposition of Maudsley. The jurists of the period would not deny it. The traditions of Christendom, however, support the counterview—which is so utterly repugnant to the rational sense and to the enlightened humanities. Until that is changed there can be no proper degree of humanity meted out to such as become insane, commit trespass, or perpetrate a penal offence. It is a procedure at variance with justice and fair dealing, let us repeat, to punish subjects of brain disease and deformity for wrongs they do. Society, let it be borne in mind, has produced them. She alone should assume the responsibility for them. It is her duty to institute measures of discipline, of training, of correction, and of education. The Church could very properly undertake this work. To what more humane work could she devote herself? To destroy these victims is comparable to the course pursued by certain animals and savages that destroy such of their young as

[1] *Responsibility in Brain Disease*, p. 38.

happen to be a burden or an inconvenience to them.

The doctrine that society necessarily provides the conditions under which the race is bred is of old date, but new to this decade. Herbert Spencer recognized it in his great work on "Sociology," and Dr. Henry Drummond illuminated it with his genius in his fine book on "The Ascent of Man." In the evolution of the planet, Mr. Spencer recognized two agencies concerned in it, namely, Nature—or God—and Man, each agent distinct and independent in its sphere. With the evolution of nature man has nothing to do—no responsibility; in his own evolution in the sociological sphere man has the whole responsibility, and God none. Having evolved primæval Man, God, in His consummate wisdom and benignity, left him to work out his own destiny, not with fear and trembling as St. Paul declared, but with such courage and self-reliance as he was master of. With the growth of the race from such imperfect conditions, as the learned anthropologists have shown, it was incumbent upon the species, not to live in isolation, each one for himself, but in sociological groups in which the individual should live for the group—or state—and the state for the individual. Such was the order of the evolution of the individual in certain primitive states, notably the Jews, more notably still, the Kingdom of Sparta. The ideal Republic of Plato was predicated on this idea. All know how far the Grecian people were removed from

insanity, want, and crimes at that time. The penitentiary was unknown; so likewise were hospitals (as we know them) and insane asylums. This order of things was swept away with the subversion of the Republic of Rome, and in its place was substituted, under the Empire, an entirely different system. The individual still lived for the state, but the state lived for itself, or the Oligarchy which constituted the state. The poor unit in society was left out of the fold, to live on such terms and under such conditions as the rulers imposed upon him. If he migrated in groups and formed pastoral communities in which to cultivate the arts of peace and plenty, he was overrun by Roman hordes, robbed of his possessions, and reduced to serfdom. The ideals of the Greeks as to a science of society in which the mothers of the race would be cared for and their children should be properly bred and inherit the law of justice and righteousness—a sociology, in which a certain degree of equality, or at least justice should prevail—was lost sight of, and in place of them the rule of every man for himself and the devil for the hindermost was substituted. This system is in vogue to-day throughout so-called civilized countries, with results which are too apparent. A large minority of the people are beggars, robbers, murderers, suicides, and thieves. Another large minority are the luxuriantly idle and affluent, the women of which avoid maternity, and are unfit to be

mothers. It is a problem, by no means difficult of solution, how long the body politic can endure under this abnormal, unsane, and inequitable condition.[1]

Maudsley quotes from the work of J. Bruce Thompson, on "The Hereditary Nature of Crime," in support of his contention. That author found, in his investigations of the inmates of penal institutions, that mental disease and physical deformities were generally associated together in the same person. It is seldom that the habitual

[1] While writing the above, April 12, 1909, the sixteenth annual report of the State Charities Aid Association to the State Commission in Lunacy, made public to-day, comes to hand. It shows that the increase in insanity last year was nearly double that for any single year in the history of the State. . . . The Association finds that it is becoming more and more difficult to obtain nurses for the insane measuring up to the new standard set for them, and that the mortality among women patients from tuberculosis is more than twice as great as among the men, and alarming. This is due, it is stated, to the lack of congenial or suitable outdoor employment for women such as is furnished for men.

The Association deplores the ill-treatment of patients in the various jails and lockups of the State during the period between their sentence and actual committal to the hospitals, by the police. Insane persons are kept in unclean cells and subjected to unnecessary suffering, the Association finds, not only in the country sections of the State, but in the City itself.

The number of insane persons in State hospitals and licensed private asylums on Oct. 1, 1908, the report shows, was 30,507, an increase of 1414 over the previous year. Of this total number 28,399 patients were in the thirteen State hospitals, not including Matteawan and Dannemora, an increase in the thirteen institutions of 1297, while the average yearly increase within the last ten years has been 741.

criminal is free from physical deformity. "As in all families or races," says Mr. Bruce Thompson, in the work of his referred to, "where physical degeneration is found, so among the criminal class, we have very often abnormal states,—such as spinal deformities, stammering, imperfect organs of speech, club-foot, cleft-palate, hare-lip, deafness, congenital blindness, paralysis, epilepsy, and scrofula. These usually accompany congenital weakness of mind." He shows some asymmetry of form or movement by which the criminologist is able at once to declare his mental character. The expert alienist is likewise able in most cases of insanity to detect the disease by the general appearance of the subject. While the signs and symptoms, however obscure or indefinite, are clear and unmistakable to him, he often is unable to make them equally so to judge and jury.

Insanity and criminality are founded, therefore, in mental conditions that are nearly related. It is true, as Maudsley observes, that often crime is a sort of outlet in which unsound tendencies are discharged; the subjects of them "would go mad if they were not criminals, and they do not go mad because they are criminals."[1]

These views are in perfect accord with those of the distinguished criminologist, the late Cesare Lombroso.[2] There is a criminal neurosis

[1] *Responsibility in Mental Disease*, p. 32.

[2] *The Female Offender*.

as well as an insane neurosis which must pre-exist in the character before the subject of either can or would exhibit insane or criminal acts.

Crime is not, then [says the learned author of "Responsibility in Mental Disease"],[1] a simple affair of yielding to an evil impulse or a vicious passion, which might be checked were ordinary self-control exercised; it is clearly sometimes the result of an actual neurosis which has closer relations of nature and descent to other neuroses, especially the epileptic and insane neuroses; and this neurosis is the physical result of physiological laws of production and coalition. No wonder that the criminal psychosis, which is the mental side of the neurosis, is, for the most part, an intractable malady, punishment being of no avail to produce a reformation. A true reformation would be the *re*-forming of the individual nature, and how can that [pertinently asks the author] which has been forming through generations be *re*-formed within the term of a single life? Can the Ethiopian change his skin, or the leopard his spots—[in a generation]?

Dr. Maudsley's work on "Responsibility in Mental Disease," without having the object in view, represents the marvellous stride that this period has made in the knowledge of diseases of the mind and nervous system. The volume is a fitting crown to his life-work. The views enunciated therein do not represent the author's views alone, but include those of representative alien-

[1] P. 33.

ists and neurologists in Europe, from the writings of whom he quotes.

Maudsley was born in London in 1830, and received a liberal education preparatory to the study of medicine. The cast of his mind naturally led him to the study of mental science. His first little volume, published in the sixth decade, was entitled "Body and Mind." His second venture was a more pretentious work on the "Physiology and Pathology of the Mind," antedating Dr. Carpenter's excellent treatise on "Mental Physiology." His last considerable work was "Responsibility in Brain Disease," from which we have cited. He represents the advanced thought of the profession on that subject. It was published in America in 1874, but awakened very little interest in the public thought, and none at all on asylum methods of caring for the insane, for reasons which we have above stated. Upon the judiciary and legal profession the work has had a salutary influence.

Dr. Maudsley is a Fellow of the Royal College of Physicians; Professor of Medical Jurisprudence in University College, London; Physician to the Royal Manchester Lunatic Asylum, etc.

Studies in diseases of the nervous system—Neurology—were taken up in this decade and prosecuted with great industry. Its students received the appellation of Neurologists, and their profession, or specialism, Neurology. In the colleges, the Chair of Diseases of the Brain and

Mind was separate and distinct from that of Diseases of the Nervous System. The latter necessarily embraced the former; but the former was confined to derangements of the personality, the psychical function or phenomena, the seat of which is located in the cerebral cortex, exclusively. The class of specialists devoted to this last branch of the subject were called Alienists, or Psychiatrists. At first thought, the division of the great subject of the brain and nervous system seems illogical and irrational, since the brain is the predicate of nervous power and the primal source of nervous phenomena. But when the marvellously complex organism of the human brain is considered, with its myriads of cells, and the almost equally marvellous system of nerves and ganglia which constitute the nervous system of man are taken into account, the division of the complicated structures for convenience of study loses the sense of incongruity it seems to possess. The field of study of each branch is so vast that other divisions seem to be a not unlikely probability.

A phenomenal advance in the knowledge of the brain and nervous system was made in this decade, not so much in the knowledge of function as of structure. All knew that the brain was the organ of the mind and the seat of motor and sensorial impulses; but knowledge of the minute anatomy of its organs and substance and the relation of its complicated system of cells and ganglia

was wanting. German savants have the honor of leading the world in these investigations, the more prominent being Kölliker, Golgi, Betz, Reinak, Munk, Fritsch, and others; Baillarger and Charcot among the French; and Bevay, Lewis, Ferrier, and others among the English. The minute anatomy, or histology, of the structure of the cortex exhibits one of the greatest—the very greatest—wonders of cell-formation. Its anatomy embraces several layers (fine) filled with every variety of cells and little ganglia composed of groups of cells. There are pyramidal cells, giant cells, so called by their relatively greater size, the fusiform cells, spindle cells, etc. Delicate films from the white brain-substance underneath the cortex, communicate with this unique cell-system for the purpose of receiving and transmitting messages, sensorial, and motor. To Betz is credited the honor of discovering the "giant" cells.

The largest cells occur in groups of two to five, and are almost confined to the central region; while the middle ganglionic-cells of this layer are met with over the greater part of the surface of the brain. Beneath this structure is a layer in which, with a few angular cells, there are many fusiform cells. Hence it is called the spindle-cell layer. It is the deepest layer of the cortex, and beneath it is the white substance of the hemispheres, among the fibres of which are many nuclei and a few spindle cells, especially near the cortex. Thus the type here is finely laminated.[1]

[1] Gower's *Diseases of the Nervous System*, ii., p. 11.

This wonderfully delicate structure, of which little was known until revealed by the most powerful microscope of modern times, is the fount whence proceeds the marvellous manifestations of the human mind. Upon its normal condition and activity depend the rational sense, all the intricate and complex manifestations of reason, memory, idealism; the far-reaching power of the mathematician, the genius of poesy, the sense of the beautiful and the sublime; the recognition of a Supremacy, imminent, divine, and beneficent. Upon its disordered or mal-condition depend all the complex varieties of insanity, the ravings of the mad, the morbid impulses of the paranoiac, the homicide, and the suicide; the disgust of life and living of the melancholiac and misanthropic; the despair of the religious monomaniac, and the dreadful perversities of the moral degenerate. How true is the luminous maxim of M. Broussais that "man is but half understood if observed only in health!"[1]

In this category of mal-manifestations should not be omitted the abnormal effects upon character which are due to disproportion of organ development of the cerebral cortex—the excess of some powers, the deficiency of others in normal condition, which are due to heredity, and upon which must be predicated the disharmony of conduct, moral and intellectual, of individuals—not insane—with which society of civilized life

[1] *Irritation and Insanity.*

abounds to-day. This last is not altogether a deduction of our own. The anomaly is largely due to defects of education.

When we contemplate the exceeding delicacy and complexity of cerebral anatomy, which as yet is not wholly known even to the acutest histologist and neurologist, one cannot but wonder that, under the gross unsanity of conditions of civilized life, insanity is not more prevalent than it is. Infinitely more delicate is the mechanism of the brain and sensory centres than that of the tiniest watch or chronometer, or the mathematical instruments of the geologist or astronomer. Faulty blood, which must necessarily follow an incongruous meal, over-feeding, consumption of the alcoholic beverages and narcotic poisons, as tobacco, cocaine, morphia, absinthe, etc., and the acute indigestions, otherwise the auto-toxæmias, which are of such frequent occurrence, are causes that would naturally disorder, if not disorganize, the harmony of this delicate structure, and with it the functions of thought and feeling. Experience and observation amply justify the inference; the sensitive to morbific causes know it by personal experience; the physician knows it by personal observation, sudden death not infrequently being caused by such impositions on brain centres and brain functions.

It will appear evident, therefore, by the facts we have presented, with deductions from them, which might be indefinitely extended, that the

progress of medicine has made an enormous stride in the direction of its highest and most important achievements in the department of physiology, pathology, and therapeutics of brain and mind, and their far-reaching influence upon civilization. Of a truth, medicine has made a conquest of scholastic philosophy—although the fact is ignored by its adherents. The world can never fully know, nor sufficiently appreciate, the debt it owes to the unselfish and gratuitous labors of French, German, and English savants—the despised of the prelates of "vested interests." And yet it is no debt. The love of truth constrained them and the delight of knowing was their reward. But a still greater reward is the satisfaction of being able to make some return to the race for the generous gifts which the race has made to them.

The literature of the decade on this subject has been considerable—too voluminous to mention. The work of Oppenheim on "Diseases of the Nervous System" is among the best. Gower's work in two large volumes came a little later, and must be given pre-eminence. It first appeared at the end of the eighth decade, as did likewise Oppenheim's great work. Both these works are elaborate, and show painstaking industry, the succeeding editions being thoroughly revised and brought down to date. Distinguished neurologists of America have likewise contributed to advance the subject by the publication of valuable

works. Its therapeutics is hardly up to its physiology and pathology.

Many works of merit appeared in this and the previous decade on mental medicine. Among the most conspicuous writers were the celebrated Krafft-Ebing and Erb in Germany; Pichon in France, author of "Maladies de l'Esprit" (1888); M. Legrain, "Les Poisons de la Intelligence," an excellent and appropriate title, for it is not improbable that poisoning of the mind, through defective functions of liver, kidney, and colon, does often take place; Tuke's "Influence of the Mind on the Body" (1874). This last work is the first scientific attempt to trace definitely the connection and relation of the cerebro-spinal system to that of the grand sympathetic system of nerves and ganglia. It is a treatise of great merit, and should be studied by the medical and metaphysical psychologist, and others who would minister to that large and growing class of neuro-mental maladies. "Manuel Pratique de Médecine Mentale" appeared at this time, a lucid work of its kind by M. Louis Régis. An excellent translation in English of the second edition of the work was made by the learned Dr. Bannister, in 1894.

We have observed that the therapeutics of mental maladies has not kept pace with the progress of mental physiology and pathology. The insane are still more or less under the prejudice of a public biassed by hereditary impressions; and the persons whose duty or function it is to

make proper provision and appropriations for the care and treatment of this class of persons among the poor and dependent are greatly remiss in their duty, not from personal prejudice, but in deference to the tax-payers, of whom the politician stands in fear. Complaints are heard on every hand, not alone in America but in Europe also, of gross neglect of the sanitary conditions, cruel, inhuman treatment, inadequate accommodations, and lack of proper medical care and consideration given to this unhappy class. The criminal insane, especially such as are without means to pay for comforts, are confined, too often, in cells dark, dank, cold, and unclean, with scarcely more comforts than those accorded to domestic animals. Nevertheless, the advancement in the sanitary care and medical treatment of the insane during the century, and the awakening of public sentiment as to their conditions and needs, show most gratifying improvement, to the credit of a profession most unselfish and humane, be it said.

SIXTH: PERIOD OF THE NINETEENTH CENTURY

(*NINTH DECADE—Continued*)

CHAPTER XXI

Christian Science and its Rationale

I

WE come now to give some account, somewhat belated, of a semi-medical, semi-religious phenomenon, which appeared in this country in the seventh decade of this century. We refer to "Christian Science," so called. It is rare in the history of the world that a cult has arisen from a source so humble in the very heart of Christendom, and spread with such rapidity, and displayed a vitality so remarkable. China and India have been prolific with cults, but they have had their origin in men of great natural ability and still greater intellects and spirituality. In the fair authoress of this phenomenon we have a woman, uneducated, without pretence of learning or claims to knowledge, except such as she gained from the Bible, the texts of which, however, she presumed to interpret in her own way, although

having no knowledge of the language in which they were written. Her youth was not remarkable. She was born of humble parents. She received a common-school education. She was by no means precocious. Her career up to the age of fifty was rather an unsuccessful, adventurous one. She was married twice and divorced once. She was therefore no Vedantist, and made no claim to sainthood. She had not risen to the moral beatitudes of a Virgin Mary or an Anne Lee, a Jesus or a St. Francis d' Assisi. Her life showed that she possessed the ordinary weaknesses of her sex. The mission which she claims was given to her by Almighty God, came after the follies of youth and maidenhood were passed and the decline of womanhood had set in.

It will readily occur to the reader that Jesus of Nazareth was of humble origin and unlettered, but that He had a distinguished heredity. Moreover, He had truths to enunciate which were new to His generation and of commanding importance to humanity, and demonstrated them before men's eyes. Far different was it with the fair priestess of Christian Science. She had nothing new to present to a suffering and oppressed people which they were eager to hear and by which to be consoled. And as to proofs of cures by suggestion—the alleged mind of God—they are less wonderful than those recorded by the inventor of Perkins's Tractors. Nevertheless, she won more

followers in the first third of the century of her career than Jesus Christ won in two centuries!

"As early as 1862," writes Mrs. Eddy in the third person, in the preface to the edition of "Science and Health" of 1902, "she began to write down and give to friends the results of her Scriptural study, for the Bible was her sole teacher; but these compositions were crude—the first steps of a child in the newly discovered world of spirit."

There is something extremely grotesque in a person—not to say a child—presuming to criticise with an air of authority, the New and Old Testaments, confessedly ignorant of the times and the language in which they were written!

Again she says:

Before writing this work on "Science and Health," she made copious notes of Scriptural exposition, which have never been published. This was between the years 1867 and 1868. These efforts show her great ignorance of the subject up to that time, and the degrees by which she came at length to the solution of the stupendous life problem; but she values them as a parent may treasure the memorials of a child's growth, and would not have them changed. Her first pamphlet on Christian Science [she writes] was copyrighted in 1870, but it did not appear in print until 1876, as she had learned that this science must be demonstrated by healing before a work on this subject could be profitably studied.

Demonstrated by healing! All know how delusive such facts are—or ought to know;—and

yet it came from God! But she shrewdly secured a copyright, exhibiting a scent for profits rare even among men of the world.

The reasoning of this excellent woman was at fault. There is such a thing as sane delusions, and in her case one has an illustration of it. It appears by her own statement, which we have quoted above, that she would not announce the mission which had been communicated to her by such a high authority as God until she had proved the correctness of her method of healing, by facts, or clinical demonstration. She could not trust God! She must have ocular demonstration. To this end she put her views into practice, with results which astonished her. The sick got well under her treatment, silent and prayerful; ergo, silence and prayer effected the cure. She recorded the hits but not the misses, as do all medical system builders—as did Priessnitz, Mesmer, Perkins, Hahnemann, Trall, and others. She committed the same errors of judgment that all her predecessors had done; she based her system upon clinical facts, upon *post hoc propter hoc* facts, than which no evidence is more delusive. She was deluded and beguiled by a member of her own sex, who beguiles so many of the opposite sex: Dame Nature spoke to her in a siren voice, saying: "Go on with your pet ideas and theories, your medical system and mummeries; no matter what your ideas of cures by prayers and text readings may be; keep the patient's

mind fixed on your agencies, be they physical or psychical; I will answer for the results." Again she showed her shrewdness by taking the dear old lady at her word, which she knew to be trustworthy.

The authoress claims boldly that "God called her to proclaim His Gospel to this age." That sentence has an ominous reflection on the woman's sanity. How could she know that it was God who called her? Such has been the claim of all cultists that ever cursed the world and made a fortune out of human credulity. Every one began by professing an intimacy with the august Author of the Universe, without a scintilla of evidence to prove it.

Again, "the first school of Christian Science mind healing was begun by the authoress in Lynn, Massachusetts, about the year 1867, with only one student. In 1881 she opened the Massachusetts Metaphysical College, in Boston, under the seal of the Commonwealth. No charters were granted to Christian Scientists for such institutions after 1883, and up to that time hers was the only college of this character which had ever been established in the United States, where Christian Science was first introduced." And the authoress goes on to say that during the succeeding seven years more than five thousand students were taught by her in this college, besides attending to her pastoral duties and editing the *Christian Science Journal*.

One cannot but marvel at a success so phenomenal. We venture to say that there never was a university in Europe or America that could show a like success. Nor can we wonder less what could have been the inducement to cause this wild mad rush to her college! At that time, it should be observed, the disciples of "Science and Health" were chiefly women, an excellent class of women, but a class recruited from the ranks of those who had left their husbands, or their husbands them, and who were under the necessity, therefore, to earn their own living.[1] What were their motives? The love of doing good? The desire to serve Christ? To feed the hungry? To defend the fallen and outcast? Was it in obedience to the call of duty, or the love of money? The reader must answer these questions for himself.

On the religious aspect of Christian Science there is little to criticise and much to commend. The Christ religion which she professed to adopt was not a new religion, nor was it of mushroom growth. It was not a creature of a night It grew in the open. It did not rest upon facts nor mysticism —nor even miracles, which M. Renan thought compromised it—but on self-evident propositions, the spoken word of an illuminated Mind. Christian truths were not voted upon by synods and councils to decide their verity. There was no mystery about the Golden Rule. So far as the truths of Christian Science are based on the New

[1] Personal recollections.

Testament and the precepts of Jesus Christ, there is nothing to criticise nor to apologize for. It is a pity that the authoress of "Science and Health" did not stop there, and confine her system of religious philosophy to the enunciation of common-sense truths.

The first edition of "Science and Health" was scarcely half the size of that from which we have quoted. Its author shows pride in her work, and has evidently given her leisure thought by night and by day to emendations and corrections, making each new edition, prudently copyrighted, to represent the latest and more complete evolution of her thought and its embodiment into her system. There is no author who will not understand the labor and pains that the work has cost her. She would be perfectly justified in withholding from God any part of its authorship, and of claiming its whole labor and responsibility herself.

We would not be understood as inferring that the Reverend Mary Baker G. Eddy was moved to her task by motives of philanthropy, or a desire to serve, or ameliorate the conditions of the world. To judge by appearances, one must believe that she had been actuated more by self-love and ambition than by the love of God or humanity, rightfully presuming that she had wittingly or unwittingly struck a gold-mine, with veins of the precious metal deeper and more widespread than those of Sacramento or Alaska. This con-

clusion is justified by her business career. She makes humanity pay for what she gives them. With her it is a *quid pro quo*. She has published her own editions and kept the copyright; and since new editions were frequent, she has perpetual copyrights. Even her hymns are copyrighted, although they are no improvement over the doggerel of the old hymns. Naturally, therefore, she is a rich woman, living in a palace, paying her numerous servants high wages—her chef one hundred dollars a month; her chauffeur one hundred and fifty dollars a month, and runs a five-thousand dollar automobile. She does not pretend to practise "Imitations of Christ." In these respects she disregards the injunctions of the divine Nazarene against the dangers of dying rich, or of laying up treasures on earth lest thieves and sharpers rob her of them; of taking no thought for the morrow, lest one's thought be diverted from the life of greater importance in the world to come. She is more practical than was Jesus, and holds the life that is superior to the one that may be. She evidently regards one dollar this side of Jordan worth ten dollars on the other. Had Dr. Luke possessed her foresight and business sagacity and had had his excellent copy of the Gospel of Jesus copyrighted, and like her kept it copyrighted, he, too, might have been rich. It probably did not occur to him. The sense of cupidity was evidently lacking in the brain of the Gospel writers as well as in that of Jesus himself.

To the credit of the Reverend Mary Baker G. Eddy must be placed many wise and judicious suggestions for the care of the sick and the conduct of "Healers"—though in practice they are carried to the extremes of the ridiculous. For example, the sick must not talk about their symptoms and sufferings, not admit their existence. They must not go about with long faces, dwell on the miseries and misfortunes of people, speak ill of any one, nor gossip about people or their affairs. These precepts are wise and judicious. The true Christian Scientist must deny the existence of matter and its properties, the evils to which it is subject; and although he may suffer the torments of the damned, he must deny it and insist that his infirmity is due to an error of thought and is of no consequence. The precepts of Jesus constitute, as has been observed, a prominent part of the pharmacology of the "Science of Health." Prayer, silent and unspoken, is its chief agency. It wisely forbids praying in public. Even the church service is conducted without spoken prayers, except the Lord's Prayer, modified by the authoress. This last feature of the religious service, adopted by Christian Science, must meet with the approval of many good and wise men and women in the Christian churches and other places of public assemblage, such as the Congress of the United States, the State Legislatures, political and religious conventions, in which public praying could be wisely

omitted. It is not likely that the Deity hears them; if He does hear them He must have contempt for the sycophantic and hypocritical supplicants, however, elegant their rhetoric.

On the scientific side of "Science and Health" it is difficult to take the venerable authoress seriously. It is the most astonishing piece of verdant verbosity of modern times—perhaps of any time. It is a travesty on common-sense. The author of these pages is an idealist and holds to the doctrine of the unity of matter and force, the spiritual and physical. Nevertheless, the truths of science must be respected. That is a religious duty. The venerable authoress has little respect for demonstrable truths, and treats the sublime discoveries of modern times in the domain of etiology, or morbific causation, cerebral physiology and pathology, and the relation of mind and body, with haughty contempt. All is mind, she declares. There is no matter; disease is error; do rightly, think rightly, then so-called disease will disappear. In therapeia, all the agencies of the profession do but add to complications of life, and increase its miseries! The authoress even denies that the human mind has any influence upon malady in curing or causing it. The removal of error restores harmony with the divine Mind, which is Health restored. It is not the influence of the patient's own mind on the body that cures, or an indwelling curative or healing principle. It is the direct power of

God that heals. It is the divine Mind. There is no matter; *ergo* there is no body. Such in brief is the reverend authoress's idea of the modus operandi of all remedial agencies and entities.

As we have already observed, it is difficult to take the authoress seriously. Even those of the advanced Idealistic School of Philosophy cannot but be shocked at the stupidity which the authoress of "Science and Health" displays in dealing with problems from the metaphysical point of view. And were it not for the large and respectable following which the cult has acquired, we should drop the subject here.

There are few instances in history of reformers exhibiting the dogmatic audacity to the extent displayed by the Rev. Mary Baker G. Eddy. Bombastes Paracelsus of the sixteenth century exhibited a like contempt for the opinions of his contemporaries and the experience of mankind, but nothing comparable to Madam Eddy. When upon being appointed to a professorship in the University of Basle in 1526 Paracelsus burned the text-books of his predecessors—the great works of Galen, Rhazes, Avicenna, and others, saying he had no use for them; and again, in writing Latin, the language of literature of his day, he wrote in contempt of its grammar and orthography. A similar display of puerile self-conceit and ignorance was that of the celebrated Jean Jacques Rousseau ("Confessions," vol. i.) in the orchestration of a piece of music of his own

composition, in total ignorance of the laws of musical harmony, and along lines of conception original and of his own. The effect was most grotesque, and was laughed off the stage.

But the Rev. Mary G. Eddy outdoes in audacity Paracelsus or Rousseau in disregarding the truths of science and in showing contempt for the unselfish and conscientious workers in science. She was born too late. She really belongs to the period of the schoolmen of the twelfth century, or earlier still, to the days of the Greek sophists and idealists, at the outset of the Christian era, who wished to find a philosophical basis for the spiritualistic conceptions of Jesus. They held learning in contempt, and so does the excellent authoress of "Science and Health."

A brief account of that interesting School of Philosophy may not be uninteresting, or untimely, in this place. Its leaders professed to find in the idealism of Plato a justification of their own. But Plato, while an idealist, with followers even to-day, did not stultify common-sense, nor disregard the realities of sense-perceptions. Plato was a dualist, believing in matter and mind, although giving mind the precedence, as many scientific men do to-day, the learned Professor Thompson of Columbia University being one of them.[1] The celebrated Parmenides boldly denied the reality of matter, the physical world, and the authority of our senses, looking upon the latter as misleading.

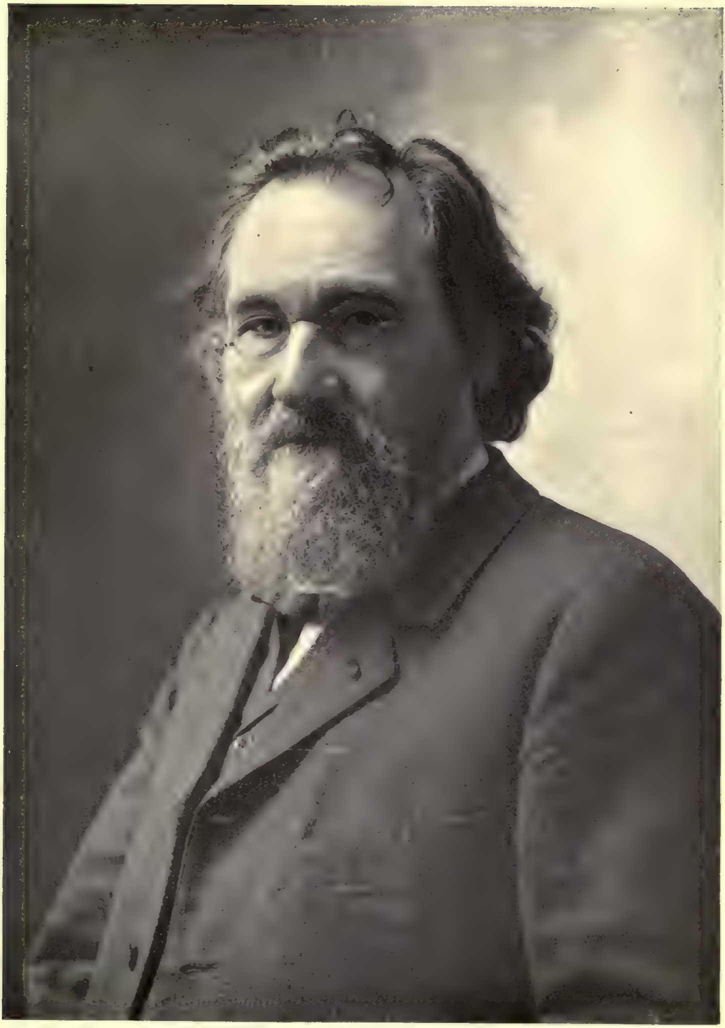
[1] *Vide* his work on *Brain and Personality.*

His eminent contemporary, Gorgias, declared the physical world to be an illusion, and that the only real existence was mind. Nothing had any substantial, material reality, he maintained. But, unlike the fair authoress of "Science and Health," so firmly was he convinced of it, so firmly did he believe it, that his friends had to guard him against accidents, "lest he should walk off a precipice or be run over in the streets." It does not appear that the friends of Mrs. Mary Eddy have any anxiety as to accidents to her for entertaining a like delusion. Zenophanes and Pyrrho were imbued with similar skepticism of real existence, while the distinguished Zeno denied the reality of motion. These notions seem absurd enough to one who accepts the authority of the senses for the evidence of objective existence; but they were legitimate to them, since they denied objective, and regarded ideas as the substratum of any real existence. These ideas were the forerunner of that school of mysticism and folly which succeeded the decline of the Alexandrian and Greek science in the second century of the Christian era, under the name of Neo-Platonism, which held doctrines as to the primacy of mind and the non-existence of matter similar to those of the Rev. Mary Baker G. Eddy. But they did not carry their doctrines into the domain of the art of medicine, which under the patronage of the great Ptolemy achieved much prominence at that time.

The best type of this sect and philosophy, or non-philosophy, was Plotinus, himself a disciple of the celebrated Ammonius Saccus, who lived at Rome in the reign of Claudius, in the second century. To his pupil, the learned and pious Porphyrus, are we indebted for an account of his life and mystical philosophy. "He lived a life of meditation, gentleness, and self-denial," and in close communication with the divine Mind, it was alleged. His idea of the relation of the intelligible world with the world of sense, the spiritual with the physical world, was similar to Swedenborg's doctrine of Correspondence. Plotinus bewailed his mortality, his "mortal mind," or, as Porphyrus says, "he appeared like a person ashamed that he was in the body. In consequence of this disposition," continues Porphyrus, "he could not bear to talk concerning his family, or his parents, or his country." He did not like to recognize an earthly father. Like some of the Christian Fathers in the Church, at a later period, Plotinus regarded the origin of man through sexual connection essentially low and vulgar. Man was born in sin and bred in iniquity, thought he. Many divine men—there is no record of divine women—came to earth through virgins, conceived by the Holy Ghost!

Plotinus and his disciples converted the abstract, or subjective, into real entities, substantives. To them ideas were things, thoughts were the only entities; the objective world was the

reflection of the subjective world, which was fleeting and inconstant; while the spiritual, or subjective, was permanent and constant. The objective was mortal; the subjective was immortal. The authoress of "Science and Health" maintains anew this obsolete and absurd doctrine. Furthermore, the Neo-Platonists, and, later, some of the hair-splitting Greek Christians and sophists, carried these mythical doctrines to the extremest lengths. Not only did they materialize ideas, passions and sentiments, and embody them in sculpture and painting, but they assumed to exercise power over disease, evil spirits, the physical elements, physical phenomena, the wind and waves, gravitation, life, health, and death itself. These powers were falsely ascribed to the divine Nazarene. The great exemplars of this sect professed to live on terms of familiarity with the Deity; they held converse with the distinguished dead, the gods and goddesses, Apollo, Pluto, Juno, Minerva, and to have communications with ghosts, and to be visited by apparitions and shades. This was especially said of the celebrated Iamblichus, Orpheus, Proclus, and many of the lesser lights of that era. This sect embraced men who lived austere lives and possessed pure habits, undoubted piety, and were devoted to the rites of religion and the service of God—so-called. That they were sincere was unquestionable; that they suffered from delusions was equally unquestionable; for the things they claimed to be



Élie Metchnikoff.

From Portraits à la Luminaire Électrique. Kindness of Mlle. Laflin, Paris.

able to do, and believed that they did do, were of a character so out of the region of ordinary phenomena as to be incredible to the rational individual. They despised the laws of mental sanity, and wandered in the vale of delusions.[1] If they were judged by the tests of sanity of to-day, they would be pronounced insane and sent to a lunatic asylum. But it is an insanity of a harmless kind, a type of disease with which the world of all ages has been familiar. Its victims have been known in the annals of medicine from time immemorial. Nevertheless, the world is indebted to them for its moral precepts, the Golden Rule the Decalogue, and its great systems of religion, not excepting "Christian Science."

It is no reproach to believe falsely—to misconceive the truth, the relation of cause and effect, of body and mind, the divine and human. In the absence of knowledge, man must believe and believe blindly—of things he does not know—which is Faith. And in the state of general ignorance in which he has always lived, and does live to-day, he is more likely to believe a lie than the truth; and it is hardly consistent with a code of good morals to account that error which is unavoidable, inevitable, and therefore legitimate. *It is the purpose of an individual* that rates him in the scale of righteousness, high or low. If he can stand that test, and live a life open and exem-

[1] The account of this sect is paraphrased from the author's *Monism of Man*, the Prologue.

plary, he may be guilty of folly, and believe and practise any weak, inane, illogical, irrational system of religion and doctrine or quackery without committing sin—the Rev. Mary Baker G. Eddy to the contrary notwithstanding.

People of this type often conceive the idea that they are the recipients from God of a message to the world. Many of them devoutly believe it, although they can have no proof of it. All know that the great Hebrew, Moses, professed to have talked with God and to have received the Decalogue from Him, written with His Hand. He probably believed it; it was certainly necessary that the Jews should believe it; but Moses could not by any possibility have had proof of it, for God is spirit, universal and subjective, and "no eye hath seen Him at any time." The leaders of religious movements have always been fanatics, who believed incredible things, and possessed very little knowledge about them. Early Christianity was overrun with them, before the establishment of the Roman hierarchy; and, later, Christianity suffered by them, but in a less degree, and a degree steadily diminishing—with the spread of education and the awakening of the human mind.

No one in a condition of mental sanity would claim to have personal communication with the Supreme Being. It is irreverent to assume that the Infinite can have personal intercourse with the finite. To do so, God would have to become finite, which is inconceivable—the infinitely great

becoming the infinitely little! It is a monstrous proposition.

It is unfortunate that a devout mind should be an illogical one; or that piety should be found so often dissociated from reason. The homicide, the suicide, and the pietist all have messages from God!

"Christian Science," moreover, is unfortunate in its name. Science deals only with the objective. Its scope embraces phenomena and inductions thereon. Metaphysics form no part of it; nor do Islamism, Christianity, Judaism, nor other systems of opinions and doctrines philosophical or religious. There is no fault to be found with the title "Science and Health;" but the title "Christian Science" is not only misleading, it is a solecism. *Christian therapeia* would be correct, since that is what the work deals with—and not at all with science or the demonstrable.

The time is not so far distant when the teaching of error from the pulpit, rostrum, and books on religion and science were excusable, since the full truth was not known but of few subjects, and it was better to set forth half truths, or a mixture of truth and error, than not to teach or write at all. But that day and occasion are passing; false teaching and writing are no longer excusable. The real truth on all matters of interest to the young or old, the student of science, of the arts, of philosophy, theology, religions, government, law, etc., may now be taught without

fear of misleading the pupil, or giving him knowledge, dangerous to his health or morals, and which it would be unwise to convey to him. The rule of the celebrated Virchow, for many years Professor of Pathological Anatomy at the University of Berlin, is a good one, namely, "Never to teach what one does not know"—and he declared with emphasis that one knows only objective knowledge—the knowledge of experience and observation, of which the truth may be proved. Such are the truths of science only. Subjective knowledge may be true; it is more likely to be false; and there is knowledge enough positively known—objective knowledge—the only positive knowledge—to command the time and attention of the student or pupil, without having recourse to the expositions of the conjectural, the probable, the theoretical. The advancement of the sciences of the nineteenth century, of which medicine has been the centre, has made the rule of Professor Virchow which he laid down for himself late in life (1878), not only feasible in practice, *but a duty to practise.* We respectfully commend the rule, not only to the Reverend Lady Eddy, but to others like her who may feel called by God to lead a semi-scientific movement in the interest of humanity. Let the line be clear and distinct between what one knows and what one believes. It will be found that one with a mind well developed and trained, knows very little, and believes a great deal; and that one with a

mind of average development, untrained in logic and science, knows much less than the former, and believes vastly more. The ignorant mind affords a fruitful soil in which to grow an ill-begotten brood of beliefs, which spreads like a contagion, to minds similarly constituted, to the infection of multitudes. Unhappily there are always individuals who stand ready to take advantage of the occasion for every variety of purpose—humane and otherwise.

The authoress of "Science and Health" is no doubt a very worthy woman, of deep, sincere piety. She does not mean to set forth error, nor to deal fraudulently with her dupes and disciples, no more than do thousands of regularly educated physicians who are wrong in their methods. It is impossible to deal frankly and openly with the ignorant sick with success. All know this, and most physicians regret it. Many of the best minds in the profession have withdrawn from practice and taken to the pharmacies, book-writing, and scientific studies, for that reason. In the case of the excellent and sincere woman before us, she is in her element. From some flaw of heredity she is a victim of *reversal* to mediævalism, and has taken to the Christian customs of that period in the treatment of the sick with this difference, that hers is no charity; she exacts fees for services rendered, and perhaps wisely. Be that as it may, her system of psycho-therapeutics, is Christian mediævalism—revived. It is sugar-

coated and compounded with the rites and services of religion as of old, but in a garb of rare refinement.

It deals with a class equally ignorant of science, but which are not impecunious as were they of old. Like her ancestors, she deals with mysticism, using the name of a Being of whom she is totally ignorant, to juggle with practices of false pretence; affects familiarity with Deity; appeals to superstition, prayers in secret and other devices of a refined "Black Art," that may suit her purpose, and excuses the proceedings on the same maxim that the mediævalists did—that "the end justifies the means."

It seems a matter to be regretted that psychotherapeia cannot be utilized without indulging in deceit, cunning, and false pretence. It is only the superstitious classes that it appeals to, however; and if they are to receive its benefactions, the charlatanism must be excused; for as soon as patients discover the source of the juggling of which they are the dupes, its power upon them is at an end. They will no longer be benefited; for, in fact, it is *blind belief in which the potency of the cure resides*, and that can only subsist in a state of profound ignorance. Ask a person in whom some remarkable and unusual cure has been effected by "Christian Science," or "metaphysical healing,"—a cure that has baffled the skill, perhaps, and the agencies of a learned medical man, and he will most likely say, as did the

blind man of old: "I know not how it was done; I only know that whereas I was blind, I now see."

Psychology of Belief and the Rationale of Cures by Faith

II

In connection with the subject of Christian Science, a brief dissertation on the Psychology of Belief and the Rationale of Faith Cures may not be out of place.

Much advance has been made in knowledge of the subject, during the last three decades, and it seems not unlikely to become a greater factor in therapeutics, and to command more attention from the profession in the future than it has done in the past.

It is a curious phasis of mind in the human subject which makes one a prey to sane delusions, and to beliefs the most absurd and irrational. The phenomenon involves the unconscious as well as the conscious life of the individual. It comprehends a mental condition in which the victim is at the mercy of the arts of the juggler, magician, hypnotizer, and the most respectable psychiatrist. The phenomenon was at its climax in medicine of the mediæval period, and has been revived in modern times; the interested reader would not, therefore, justify us in passing it over without making some attempt to explain its rationale.

"Men bear beliefs as trees bear apples," said Emerson. It is a function as natural to one as to the other.

Belief has nothing to do with the truth or falsity of things that we believe. It may or may not be the conclusion of the judgment. It is more often the assent that we give to impressions of things when we come into consciousness, and that we believe to be true because our fathers and mothers said so, and the crowd of hereditary influences confirmed their dicta. When belief is founded upon knowledge, it may be said to be rational. When it is mere blind assent to the opinions held by the multitude, it may partake more of the nature of faith, especially when it relates to religious beliefs and rites. The average person feels justified in believing what everybody else believes; he accepts it as a matter of course; and when by much reflection and study he finds that appearances are deceptive, and facts are often not what they seem, he finds himself in conflict with his intellectual environment and an object of concern and commiseration by his credulous and believing associates.

But we are not concerned in this place with the variety of beliefs, but rather with belief itself as a psychological phenomenon.

There is great disparity in people as to susceptibility of belief. An explanation of this fact, we believe, is to be found in the dominating strength of the intellect or reasoning powers,

which many possess, over the conscious life, as posited in that of the grand sympathetic system of nerves and ganglia, the seat of man's involuntary, unconscious life. The nerves of this system decussate with the cerebrospinal, and thus bring the unconscious life of the individual into close relation to consciousness. The stronger of these systems dominates the character of the individual, and renders him credulous or skeptical as the case may be. The late Dr. Daniel Hack Tuke, in his excellent work on "The Influence of the Mind on the Body," has thrown much light on the subject to which the profession has not given as much attention as the subject demands.

Belief is a potent factor in maintaining the continuity of social institutions. The Roman hierarchy, the most powerful, perhaps, that the world has seen, is made thus powerful solely by virtue of the uniformity of belief of its adherents. One trembles to contemplate what the force of that influence was when the whole Christian world believed that the Pope held their eternal destiny in his hands, and could send, by a stroke of his pen, any victim of his displeasure to heaven or to hell! Such was the force of belief on the catholic subject. Since there never was an institution in all history that had not its right to be, the Roman Church is probably no exception. It must be conceded that while its influence for evil has been incalculable, its influence for good could not be over-estimated, more especially in the

early centuries of the Christian era. Our concern should be, lest it should outlive its usefulness, as all laws and institutions predicated on mere belief are prone to do. The Protestant denominations of the Christian world are slowly crumbling into decay for the want of coherency of belief, a belief that meets with general acceptance by the Protestant element. This process of segregation among Protestant churches, which began half a century or more since, with the rise of Unitarianism in this country, has steadily increased in force and volume, and seems likely at no distant day to disrupt it altogether. It is a trend of wholesome influence. It requires no prophetic eye to see what the end will be. At first, this process of segregation was insidious. It did not seem to be of much moment, as it was confined to a class of persons with a trend to infidelity, or disbelief in all religions. Later, it took on a more serious aspect and embraced the more reputable and intelligent members of the Church itself, who, while holding firmly to the Christian religion, preferred to interpret Christ's teachings to suit themselves and in accordance with their own convictions of the verities.

It is strange to us that the leading minds of the Protestant churches should not have foreseen the perils that beset them, and placed themselves in accord with the movement which was the Zeitgeist, or spirit of an age of light and progress moving over the Western world, instead of pro-

ceeding to discipline reputable teachers and laymen for apostasy, and to impeach their brothers in the minority for heresy. Many of the doctrines in the creeds of the Protestant churches have long since been outlived by the reputable. They were too irrational for belief, even by minds without pretence to scholarship, much less to minds trained in logic and acquainted with the history of religious thought. But even now, instead of frankly admitting misconceptions and fallacies of beliefs and doctrines, they seek to cover them up, by ignoring them, or trying to put a different interpretation upon them, or holding to the truth in their conscience and to their confidants, while preaching another and false view to the people, on the specious plea that the people are not ready for the truth and would be misled by it. O tempora, O mores!

There is no way to arrest the disintegrating process of the Protestant Church, but by dropping the creeds and frankly and openly turning away from obsolete errors of the past, and accepting the truth as revealed in science and philosophy. Professor Rauschenbusch, of Rochester University, in his fine book on "Christian Socialism," in effect takes the same view. He distinctly declares that when the words of Jesus are in conflict with the truths of science, they should be disregarded as never having been uttered by him, but were put into his mouth by those that reported and misunderstood his sayings. Truth must be

taken as authority, rather than the utterances of any man who has no stronger claim to our recognition than the oracular "Thus saith the Lord." Belief is in no danger of extinction, nor is religion. There is more belief to-day outside of the Church than there is inside of it. But it is a belief founded upon the revelations of science. Be that as it may, there is a sense in which the theological maxim has some force. Practically, what a vast majority of men believe must be accepted as true, *for they make it true*. The laws and customs of society are founded upon what is generally believed, the violation of which would produce a state of anarchy. Evil comes by failing to keep one's belief in harmony with advance of knowledge.

The psychology of belief is many-sided. It used to be a maxim in theology that what everyone believes must be true. There may be an element of truth in that maxim to-day; but there was no truth in it when it was promulgated. Prior to the Renaissance, or prior to the advent of a rational method in the test of truth, it was not true. Down to Bacon's time, what nearly all men believed was false. At that time the whole Christian world believed in the literal resurrection of the body, than which no belief could be more irrational or absurd. The great thinkers of the Church early taught the doctrine. The most prominent of them were, in the early centuries, Justin Martyn, Tertullian, Athenagoras,

Chrysostom, and Augustine. These wrote treatises on the subject, among the most curious of which was St. Augustine's. He boldly asserted:

> Every man's body, however dispersed here, shall be restored perfect in the resurrection. Every body shall be complete in quantity and quality. As many hairs as have been shaved off, or nails cut, shall not return in such enormous quantity to deform their original places, but neither shall they perish; they shall return unto the body, into that substance from which they grew.[1]

In modern times the doctrine has been modified by many prominent believers.

> We are warranted by the sacred oracles [says the devout Thomas Dick, writing about the middle of the nineteenth century] to entertain the hope that these mortal bodies of ours, after they have mouldered in the dust, been dissolved into their primary elementary parts, and become the prey of devouring reptiles, during a lapse of generations or centuries, shall spring forth from the tomb to new life and beauty and be arrayed in more glorious forms than they now wear; yea, that all the inhabitants of our globe from Adam to the end of time—though the bodies of thousands of them have been devoured by cannibals, have become the food of fishes and of beasts of prey, and have been burnt to cinders and their ashes scattered by winds over the different regions of sea and land—shall be resurrected by the Voice of the

[1] *Vide* Alger's erudite work on *The Doctrine of a Future Life*, p. 472.

Son of God, and shall appear each in his proper person and identical body before God, the Judge of all.[1]

Millions of Christians to-day believe on this subject with Dick without reason and in spite of reason.

Moreover, it is a question how far mere belief, by a kind of hypnosis, goes to produce the effect believed. We know, for instance, that a widespread belief in the coming of an epidemic of disease may hasten, if it may not produce it. Also a strong disbelief in its existence will often allay or prevent it, so potent is the power of suggestion and expectation upon the minds of the multitude. So serious a blood condition as scurvy has been cured through the power of belief and expectation. In his excellent book on the "Influence of Mind upon the Body," the late Dr. Daniel Hack Tuke quotes an account, related by Dr. Linde in his work on "Scurvy," of the relief of that disease at the siege of Breda, in 1625. The supply of medicine had been nearly exhausted, only three small vials of it remaining, when the Prince of Orange, the commander, suggested to the surgeons that the drug be diluted almost infinitely and given out to the soldiers as a new and infallible medicine for the disease, great care being taken not to give too much of it. His suggestion was acted upon, with wonderful results. Hope arose among the garri-

[1] *The Christian Philosopher*, pp. 27, 28.

son. Enthusiasm took the place of depression and despair. "The effect of the delusion," says the narrator, "was really astonishing. . . . Such as had not moved their limbs for a month before, were seen walking the streets, sound, upright, and in perfect health."[1]

Belief in the power of the "evil eye" bewitched people. This was the cause of witchcraft in Europe and America as late as the last of the sixteenth century when the excellent and irreproachable Mary Dyer was hanged at Boston for it, in 1595, rather than recant her belief. Belief in the efficacy of prayer, incantation, anointing, amulets, charms, relics, the cross, is often the occasion of "cures" of malady. Belief in sorcery and magic was at one time remedial. The Novena is practised still for a nominal consideration. Belief in healing virtues of medicines is to-day essential to their efficacy, except in the action of immune medicine. So, likewise, is belief in the doctor an important adjunct to his skill. The doctor must not only believe in himself, but the patient must believe in him also, to assure the results desired. A strong belief on the part of a patient may determine the action of a medicament in a direction quite contrary to its well-known specific effects. Pills of opium, an astringent, have been known to produce purgation when taken in the belief that they were laxative. Dr. Tuke, in his work before

[1] P. 348.

quoted, cites a case where bread pills given to a sailor who believed they were cathartic, produced that effect; and a severe case of gastrodynia was cured by bread powder given with great precision every seven minutes. The usual medicine had been given in vain. The author of these pages has known alcoholic intoxication to be produced with water when taken with the belief that it was whiskey. Dr. Tuke, on the authority of the late celebrated Dr. John Brown of Edinburgh, cites the case of a patient who swallowed the prescription instead of the medicine it called for, with excellent curative results. Whence comes this psychic power? It is clearly within the scope of the instinctive or sympathetic system. It is the curative power within us, not in any agency outside of us.

And here we digress a moment to affirm and repeat what has generally been overlooked, or, if not overlooked, at least disregarded by the practitioner of medicine, namely, that the brain and sympathetic system, with its convolutions and ganglia, is a vast reservoir of life and mind-force, which in certain conditions of the physique is in a state of torpor and quiescence, if not habitually so in the vast majority of people. This force constitutes the *vis medicatrix naturæ*, the conserving and healing force of Nature, and, as has been said, is often dormant, as in states of weakness, or general debility, more often of weak mentality, and held in reserve, awaiting an emer-

gency or an occasion to assert its power and supremacy over the organism. It is rare that the whole power of the organism is used in ministering to its wants. Most people are indolent mentally as well as physically, and require a stimulus to bring out their full powers, to awake and arouse their dormant energies. Thus Webster's great speeches were made under the influence of whiskey; Shakespeare wrote his immortal plays under the same inspiration; Blackstone wrote his Commentaries with frequent libations of port; Byron required gin to write "Don Juan"; and a certain American statesman's resource for important and strenuous occasions is champagne. Can any thinking person suppose that the marvellous powers exhibited by these men were posited in the stimulant? The truth is they were innate in each case, springing from the superior faculties of mind under the awakening influence of the stimuli. Herein is disclosed the secret of wonderful cures by strong appeals to the emotions, or belief in the power of sovereign nostrums, through the agency of the strong-lunged orator, or the art of adroit dealers in false pretences.

No one can know the vastness of this great fount of energy in the human economy unused and held in reserve. Witness the strength exhibited by the maniac in resisting restraint or control; the power of the "second wind," as it is called, under circumstances of great stress; the marvels of endurance under strong incite-

ments, stress of suffering, hunger, and cold when hope remains. Contrast the endurance of man with that of animals, vastly superior to him in physical strength, as the horse, the ox, or elephant, for example. We may reasonably assume that the energy of the higher faculties of the mind, which are woefully dormant in many people—faculties which the lower animals do not possess, such as benevolence, sublimity, intuition, ideation, imagination, belief, hope, and faith, is utilized in trying emergencies, as well as in circumstances of malady. All know that persons of strong mentality have more endurance than those of weak mentality, and that they are more immune to disease and more likely to recover from serious maladies than weaker-minded folks.

To this reserve nerve-energy the Christian Scientists appeal; the mental healer, and hypnotist, likewise; the marvellous cures effected by them being ignorantly attributed to the power of God. As a matter of fact, they are effected by rousing into activity the superior reserve of dormant energies of the organism, to which we have referred. This curative force or principle was called by the Greeks Physis (Φύσις). Is it God? Yes, and No. All force is of God in the final analysis; but all-healing power is of us and within us, and should be no more attributed to God than digestion, secretion, excretion, assimilation, the healing of wounds, the knitting of bones, etc. It is better to leave God out of the

question in such matters. It is bad taste to refer the functions of the vital instincts within us to a Divine Supremacy outside of us. But the unlettered and uninformed, as well as many that are not included in this category, have been in the habit of doing so from time immemorial, and it is likely that they will continue the practice so long as it pays to do so.

It is difficult, we repeat, to estimate the power of belief in certain temperaments, acting from the brain and mind, the cerebro-spinal nerves and ganglia, down through the nerves and ganglia of the grand sympathetic system. Its influence is stronger upon the ignorant, weaker upon the intelligent class. It has a potency more or less on the course of malady in either class which the practitioner cannot afford to disregard or ignore. It is an agent quite within the scope of scientific medicine and should be utilized by physicians as far as practicable. Its disuse by them gives charlatans and mountebanks an opportunity to reap a harvest which they have not been slow to embrace.

If the mediævalists had understood the rationale of the psychological phenomena which prevailed in their midst, there would have been no belief in the supernatural and miraculous, even though wonderful things were done, and the occupation of the sorcerer and charlatan would have disappeared, even if it had had a beginning. We repeat that, the basis of irrational belief is ignorance.

The failure to believe would have put an end to it all then, as it would to-day; or a knowledge of its nature and causes would also have ended it, for belief rests upon ignorance, and is stronger where knowledge is weaker.

The great prince of psychologists, Jesus of Nazareth, understood this subject well, though he probably knew nothing of sympathetic nerves and ganglia.

A certain ruler's daughter said within herself, "If I may but touch the hem of his garment I shall be whole." And when she had touched his garment, Jesus turned and said: "Daughter, be of good comfort; thy faith hath made thee whole."[1]

And when Jesus departed thence, two blind men followed him, crying, and saying, "Thou son of David, have mercy upon us." And Jesus saith unto them, "Believe ye that I am able to do this?" They said unto him, "Yea, Lord." Then touched he their eyes, saying, "According to your faith, be it unto you." And immediately their eyes were opened.[2]

And Matthew declares that in his own country Jesus "did not many mighty works there because of their unbelief"—[in him].[3]

"He doth the most cure in whom most believe," said Cardan. The so-called virtue is not in

[1] Matt. ix., 21–22.

[2] *Ibid.*, 27–30.

[3] *Ibid.*, xiii., 59.

the agent, not in the wielder of it, but in the subject—the *vis medicatrix naturæ.*

Even to-day there exists a sect among us that believes good or ill thoughts which one holds toward another may exert an influence upon him for good or the reverse. This sect is called Mental Scientists. It is allied, surely, to belief in witchcraft. It affords the basis for the practice of "absent treatment," of which one hears so much to-day. Swedenborg promulgated a similar doctrine, maintaining that many of our physical ills were due to unholy or evil thoughts. But in cases of absent treatment it is necessary, at least for the best results, that the recipient of the thought should know of it. An old friend of the writer, who is a "mental healer," says it is not necessary that the patient should be cognizant of the healer's purpose. It is not unlike the practice of exorcism among the early Christians. Such effects are called the influence of mind over matter. They are rather the effects of a man wielding psychological powers upon the young and credulous dupes of blind belief. The recipients are of unstable character, and as sensitive to the condemnation or approval of public opinion as a leaf is to the wind. We have no language to give fit expression to the contempt we feel for a man or woman, or a body of men and women, a corporation or an institution, that uses such powers to terrorize their victims into subjection

to their selfish behests. Man's chronic diseases and disabilities, for the most part, originated with his lineage; they are as old as he is—that is to say, they are eons of years old,—too old and deeply seated to be exorcised by a prayer, the stroke of a cross, the conjurations of a man in robes, by incantation, or the hypnotic suggestions of the very reverend psychiatrist. This truth has been proved over and again; but it seems likely to have to be proven again, so fond are many good and pious persons of pious frauds and humbug instigated by religious zeal, when not for pecuniary gain.

It is interesting to note that our beliefs are shaped for us by heredity, as has already been said. They are bred in us in the first place, and in the second place they are cultivated, nourished, and strengthened by the environment in which we are brought up. It is many years before the child has any ideas derived from its own observation, and when he does begin to observe, few there be that can rise superior to the conceits and notions of those about them into an atmosphere of thought, beyond and superior to that in which they were bred and born. The majority of mankind never do; they remain children, thinking and believing as their parents did, and imitating the habits and customs in vogue in the community in which they were born.

We may be pardoned in citing in this connection a few lines of Mr. Grote's admirable analysis of

the Greek conception of this subject during its most classical period:

> This aggregate of beliefs and predispositions to believe, ethical, æsthetical, social, respecting what is true or false, probable or improbable, just or unjust, holy or unholy, honorable or base, respectable or contemptible, pure or impure, beautiful or ugly, decent or indecent, obligatory to do or obligatory to avoid, respecting the status and relations of each individual in the society, respecting even the admissible fashions of amusement and recreation—this is an established fact and condition of things, the real origin of which is for the most part unknown, but which each new member of the society is born to and finds subsisting. It is transmitted by tradition from parents to children and is imbibed by the latter almost unconsciously from what they see and hear about them without any special season of teaching or special persons to teach.[1]

The influence of the social environment is inevitable, of course, and is fostered and perpetuated by our system of education, which is not individual, but uniform for all grades of children, the tendency of which is to fix and perpetuate the traditions of the past, and thus secure uniformity of development with the customs, conceits and beliefs of the past, with its laws and customs for the future. If there be any advantage to be derived from human progress and development, this condition of things is an evil to combat

[1] Grote's *Plato*, vol. i., p. 249.

and to get away from. It is incumbent upon us to lay down broader and more scientific and revolutionary lines of educating the young lives conformable to *harmony of mental development*. Why should the present be continually imitating the past? No formula of beliefs, devotion, religious or theological, should be inculcated in children, until they are of sufficient age to think and reason altogether.

It is no longer necessary to encourage blind belief among intelligent and well-disposed people in the interest of public and private virtues. The time has come to cultivate independence in those things; to appeal to reason, rather than to facts, for facts may prove anything. One should not give himself up wholly and unreservedly to believe what one cannot understand. It is far better to wait the coming of new light. It is wiser to hold oneself ready to deny to-morrow what he believes to-day, and to accept to-morrow what he denies to-day. It is better to keep the mind open and untrammelled. To be free and believe a lie, is far better than to be a slave and believe the truth.

SIXTH: PERIOD OF THE NINETEENTH CENTURY

(*TENTH DECADE*)

CHAPTER XXII

State of the Medical Sciences at the Close of Nineteen Hundred

OSTEOPATHY

FROM Neo-platonism and the philosophy of Plotinus to Osteopathy is a wide gap and a transition rather abrupt and venturesome. Nevertheless, we have to make it.

The advent of this medical phenomenon occurred in 1893. It affords another example of what men of push and self-confidence may do in a community, ignorant and credulous, with a mere show of brains. The founder of this system of massage and manipulative surgery was, if we mistake not, from Yankee land, who settled many years ago in Kirksville, Missouri. He was there known as "Crazy Still." But for the rapid spread of his disciples in the United States and Europe he would not merit a place in these annals. It was rather late in the nineteenth century for a phenomenon of this kind to appear. After

Lactopathy, Klinopathy, Karnopathy, and Electropathy, there did not seem to be room for another pathy, at least with a school of its own. Still, osteopathy made another avenue of easy approach to the medical profession for the ambitious to enter, and an easy means of winning a living from the believing and gullible sufferers of disease and malformations.

Its founder was a rough and ready man of the West, with some pretensions as a surgeon, whose name was A. T. Still. In accordance with the experience of other would-be reformers, Dr. Still became dissatisfied with his success in practising the usual method of treating diseases and deformities, and concluded to invent a system of his own. Like van Helmont, failing to cure malady by medicaments (the itch in this instance), the specific use of which he knew little or nothing, he resorted to a method in the application of which but little knowledge or learning was necessary. His reasons for it are stated as happily as could be expected from an unlettered source: "God has made man's body perfect," he declared; "and as long as the body is normal, health will reign." That is to say, as long as the body is healthy it will be normal, and when it is not healthy it will be otherwise!

The writer of such an epigram would naturally be characterized as illiterate. He begins with a false statement of fact, and ends with a solecism. But the man made no claims to learning nor

Joseph Lister.

From a photograph, by permission of Messrs. Elliott & Fry, London.

pretension to scholarship. People with one idea never do. However, he conceived that there must be some intimacy between the osseous system and the blood-vessels and nerves; and imagined that any deviation from the normal in that system must be reflected upon the others. That we concede to be a rational conception, wholly, however, within the acumen of a junior anatomist. He, therefore, began like the noted Dr. Perkins, to practise on his gullible neighbors, and with such success that he soon had his hands full of business. He then conceived the idea of interesting his patients and followers in the art of kneading flaccid muscles, irregular-jointed and dislocated bones, and ere long to establish a rude kind of school which he called osteopathy.

At this time, in 1893 [says his admiring biographer], his class of pupils was held in a rickety old building, with nothing whatever in the way of scholastic equipment, . . . and as far as his financial backing went he had none. A few hundred dollars [says the narrator] would probably have covered all of Dr. A. T. Still's worldly possessions, and as for friends he had absolutely none.

It must be conceded that this uncultured, illiterate man has achieved a degree of success quite remarkable. But so has the discoverer of tutti-frutti, and the inventor of the soda fountain, the exploiter of peruna and celery compound and other evils. Dr. Still began in the most rudimen-

tary way and has now an institution of generous and profitable proportions, with a curriculum above that of some of our second-class colleges, the chairs of which are occupied by gentlemen well qualified to teach the leading branches of medical science. Its later graduates are men and women mostly of excellent character. It is a matter of regret that such should not discard the name of osteopath and take the name of physician to which they are entitled by the statute of Missouri.

In 1894 Dr. Still was the only osteopath in the world, and his the only institution of that kind, then in embryo; in 1907 there were eight colleges flying its flag, and five thousand physicians in Europe and America practising the system, according to the statement of Miss Belle Case Hartington, in the *Cosmopolitan Magazine* for September, 1908.

The practice of osteopathy is founded upon a hypothesis rational enough, but there is no science in it. As a system it should lay no claim to a rational philosophy of disease and morbific causation. The predicate of the system, so far as we are able to judge from its founder's utterances and the writings of his followers, is devoid of a rational conception of the human organism as a whole and of the relation of its parts. That patients recover under the system must be admitted. There never was a system of practice however absurd that did not report successes. The female

sorcerer of the Fiji Islands does that, wholly ignorant of how or wherefore.[1] The administration of a medicament of the decillionth dilution has been known to be followed with curative results, sometimes quite marvellous—a degree of dilution of which a grain of medicine diluted in ten thousand hogsheads of water, a teaspoonful of which would constitute a dose, would not adequately represent the extreme tenuity of the dose. And so it is in the experience of the osteopath. He has a system of procedure and follows it, sometimes with good results, at others with results indifferent or worse. Ignorance deceives both doctor and patient as to the rationale of such results. If the excellent gentlemen and ladies who practise osteopathy were wise enough to discriminate, and to apply it as an adjunct to the art and science of surgery, to which, of a truth, it should be a part —is a part,—their standing in the profession of medicine would be much improved.

SOME LATER STUDIES IN BRAIN HISTOLOGY

Returning to the subject of scientific medicine, it is worth while to note the stride anatomy has made during the closing years of the nineteenth century, especially in knowledge of the central

[1] When called to a patient, she pretends to suck small stones from the sufferer, which she has previously swallowed and adroitly raises from her own stomach into her mouth, and ejects them in the presence of the patient.

nervous system of animals and man. Early in this decade the subject was taken up by German and Italian anatomists, Waldeyer, Nissl, Marchi, Golgi, His, Apáthy, and others. To Waldeyer, we are indebted for the doctrine of Neurons as applied to nerve cells, from the Greek word νεῦρον, signifying unit. According to this doctrine, every cell is a unit, having an independent existence, distinct and apart from other cells though related to them, and may degenerate and die without affecting the existence of the others. Meynert estimates that "the cortex of the cerebral hemispheres alone contains twelve hundred millions of ganglionic cells"; and Donaldson states that three thousand millions of cells "is a modest estimate of the total number of these neurons in the central nervous system."[1]

The doctrine of neurons has been assailed, as applied to comparative histology, by the distinguished Apáthy, and defended, among others, by Dr. Lewellys F. Barker, of Johns Hopkins University, in his masterful work on "The Nervous System and its Constituent Neurons," 1902. Dr. Barker's work is a most important contribution to the knowledge of the brain and mind, marked by original research and familiarity with the researches of distinguished anatomists at home and abroad.

Investigations in this field of study were advanced by the process of "staining" living nerve

[1] Barker's *Nervous System*, etc., p. 42, footnote.

tissue by *methylene blue*, discovered by Ehrlich of Berlin, in this decade.

SOME MEDICAL INSTITUTIONS

An important contribution to the means of scientific studies, and medical studies in particular, was made near the close of this century, by the munificence of Johns Hopkins, in founding and endowing the great University bearing his name, at Baltimore, Md., United States, in 1876.

Johns Hopkins (1795–1873) was, among others, a pioneer in projecting and building the Union Pacific Railroad, and other transcontinental lines, from which he realized a large fortune. He was associated with Leland Stanford in these great enterprises, in the early sixties; the latter also made a fortune and founded the "Leland Stanford University," at Palo Alto, California. The beautiful city of Baltimore was already conspicuous as a medical centre—or at least a centre of medical colleges, no less than seven being there located, chiefly patronized by pupils from the Southern States before the establishment of the medical school of Johns Hopkins.

The Johns Hopkins is, perhaps, the best equipped university in America. Its generous patron established, in connection with the University, a Hospital and a Foundling Institution. Its medical department has done excellent work from its beginning, its distinguished president,

the late D. C. Gilman, of Harvard, having been happy in securing professors of eminent ability to occupy its chairs. Among the more conspicuous must be mentioned William Osler, now at Oxford, England, who occupied the Chair of Practice of Medicine, and who is the author of an elaborate work on that subject (1884), embodying the best approved and most advanced suggestions and methods of general practice down to that date. We have already commented on that work. He is also editor in chief of a "Complete System of Medicine," in seven large royal octavo volumes, to appear early in the twentieth century from the press of Messrs. Lea & Febiger, Philadelphia.

The Johns Hopkins is especially fortunate also in possessing a man of such eminent ability as Professor William H. Welch, a graduate of Yale, in its Laboratory and pathological department, the most important branch, perhaps, of modern Therapeutics. The University should be congratulated, too, on the accession (1902) of Professor Ira Remson to its presidency, to succeed Professor D. C. Gilman, retired.[1] Among its corps of professors and teachers are many who have already distinguished themselves in their special departments, the numbers of whom are too numerous to be tabulated in this place.

The city of New York is conspicuous for its

[1] Died in May, 1909.

medical colleges and hospitals, at least so far as its hospitals and hospital equipment are concerned. The buildings are spacious and magnificent, their equipment and management wholly modern, with every device, means, and appliance which the state of medical and surgical art and science demands. In these particulars no city in the world can compare with it. They are phenomenal and wholly due to the munificence of its citizens.

Among these medical institutions, that of Long Island College Hospital stands conspicuously high. It is a part of the University of New York. With the completion of its new and commodious hospital building, the institution will take rank with the best in the world. The professional chairs have been filled, and are now filled, with excellent talent. The names of Professors van Cott, Pathology and Bacteriology; Raymond, Physiology; Dickinson, Gynecology; McCorkle, Theory and Practice; Rushmore, Surgery; Jewett,[1] Obstetrics, are conspicuous. Rushmore is its Surgeon-in-chief, who signalized his career by successfully performing laparotomy in 1885, and excising thirty-six inches of the ileum for the relief of intussusception. He has the reputation of being a skilful and conservative operator.

Dr. Rushmore was born on Long Island in 1845; received his primary education at the Polytechnic Institute, Brooklyn, New York; entered

[1] Died since this work went to press.

Williams College in 1867; took the degree if Doctor in Medicine at the College of Physicians and Surgeons, New York, 1870; appointed to the Chair of Surgery at Long Island College in 1882, which he still holds (1910) with honor to himself and credit to the College.

The century has been conspicuous for the growth of its institutions of learning throughout Christendom, to give a just account of which would require a volume. The great University of Berlin was of this century's origin (1808); that of Heidelberg, one of the oldest in Germany (1386), did not come into prominence until the nineteenth century. The University of Vienna (1364) reached its zenith also in that century, as did that of Edinburgh. The University of Pennsylvania has maintained a high reputation at home and abroad. Of a truth, Philadelphia may be said to have led America in its institutions of learning from the beginning. As a centre of medical literature, Philadelphia has taken the lead in this country and has maintained it. "The House of Lea," which was founded by the father of the distinguished ecclesiastical historian, the late Henry C. Lea, in 1785,[1] is the most widely known in the medical profession—with, perhaps, the house of Lippincott second in that city. The University of New York has reached mammoth proportions in recent times, and Columbia has followed closely in her wake. Few States are

[1] Now Lea & Febiger.

there in the United States that have not their universities. Men of wealth with which they are ashamed—or afraid—to die, have been lavish, these last few decades, in endowing institutions of learning, colleges for special bacteriological, physiological, and pathological investigations; theological and religious seminaries, homes for orphans and foundlings, industrial schools; institutions for the crippled and weak-minded, the fallen, and the bereft; libraries and museums, hospitals for women, dispensaries for the poor, and general hospitals for all classes. Post-graduate medical schools, for the benefit of the general practitioner and specialist, are also a special feature of modern development, and are doing good service to such as renew their youth after forty, who would improve their knowledge of science and practice, and keep step with the progress of modern medical methods.

The humane wave that swept over Europe, beginning in the last century and reaching a climax in this, respecting the care and treatment of the insane, has not yet spent its force. It was started by the illustrious Pinel, as all know, but first bore fruit at York, England, among the Quakers. Dr. Brown, the grandfather of the distinguished Dr. Tuke, to whose treatise on "The Influence of the Mind on the Body," we have had frequent occasions to refer, was the first to introduce reform in the care of the insane in England—perhaps in the world. Ere long this humane impetus

recoiled on France and crossed the Rhine into Germany, thence passed into Italy, and ultimately was felt in America. New and improved methods of caring for the insane were slow, however, in reaching her shores. It was not until the seventh decade of this century, more than a hundred years after the birth of Pinel, and a half century after the awakening of public sentiment on the subject in France, before the shackles were stricken from the limbs of the maniac and the strait-jacket fell into disuse, and anything like sanitation and proper ventilation and food, medical care and treatment of lunatics, was introduced into American hospitals for the insane. The camisole is still in use, which is a mild measure of restraint, and probably a necessary and proper one when discriminately resorted to. It should also be observed that the appointments of hospitals for the insane, in respect of accommodations, the supply of nurses and of competent medical staffs are nearly all that is practicable with the means available; complaints of ill-treatment, gross neglect, and cruelties are heard now and then, here and there, but with growing infrequency, owing to the sensitiveness of the management to improved public opinion on the subject.

The advancement of medicine is more conspicuous, perhaps, in the hospitals and sanatoriums than in private practice. America leads the world in the number and character of her hos-

pitals and hospital equipments. The buildings are new, for the most part, ample in size and proportion, often of imposing architecture, of most approved structure and plumbing; hardwood floors and trimmings; sunny, well-ventilated rooms and wards; large, well-lighted, immaculate operating rooms; trained nurses and thoroughly asepticized appointments throughout. There is no considerable town in the United States without its hospital.

In the department of practical medicine, the same degree of sweetness and cleanliness is observed. The American hospital is to-day far superior to the private house as a place of convalescence[1] from any form of sickness. The prejudice which once subsisted in the public mind against the hospital, which was, as we have already observed, well-founded, is passing away, and it is becoming customary for persons falling ill, even among such as have well-appointed homes, to seek accommodations at the hospital, especially in such as allow the services of their old family physician;—and in many cases where that courtesy is denied them. The effect of this radical innovation is already apparent on the position and future of the family physician, the more profitable part of his practice passing into the hands of the hospital authorities. Should this trend in the practice of medicine go on unchecked for another decade, the old-fashioned family physician will have well-nigh passed, the

[1] All sickness is convalescence, be it observed.

sanatoria, hospitals, and specialists having absorbed his patients. There is danger of losing his time-honored position as *accoucheur* in the family, also, the lying-in rooms of the private hospital and the expert gynecologist being more luxurious and attractive to the expectant mother than her own at home, and the expense of professional services, nurse, etc., much less. The effect of this condition of professional affairs is desirable in all respects, although it is likely to embarrass the general practitioner—for a generation. It has already checked the rush of students to the medical colleges, which is partly due, however, to the extension of the curriculum and increase in the years of the college course. This movement is more noticeable in America than in Europe, and cannot but have a salutary influence in raising the grade of the profession and elevating the dignity of the physician. If it does away with the empty pride and pomp, which were his vanity of former days, it will improve his real character and standing.

The public conscience was awakened, also, during the last three decades, as to its duty to the indigent poor, such especially as had become a public charge and inmates of the "County Home." The condition of these places was vile, too vile for pen to describe—so vile, indeed, as to make them a menace to the health of the neighborhood in which they were located, though great care was taken to isolate them far away from

other habitations. It would seem to be public policy to make these places as wretched and repellent as possible in order to deter people from going to them. The large cities of Europe were compelled to take measures to improve these places, not through sympathy for the filthy wretches so much as for the danger they created to the better classes near which they were exiled. The London poor outside of institutions in the middle of the eighteenth century were a pestiferous class, and presented a problem most difficult to deal with. But New York was no better, nor was Berlin, nor Paris, nor any other city with a dense population and gross inequality of wealth. The occasion required measures the most drastic, which consisted in driving out sub-cellar tenants and closing their vile haunts of filth and wretchedness, providing, meanwhile, abodes for them, above ground, however humble.[1] The situation called for Boards of Health, consisting of a corps of physicians empowered by the municipalities to abate all nuisances of whatever kind that were a menace to the public health. Ere long every city in Christendom had its Health Board and Health Officer, whose duty it was, not to feed or otherwise provide for the wretches of poverty, but to guard the public against them and other sources of morbific causation. Such was the origin of Boards of Health. The benefactions which the medical profession has conferred upon

[1] *Vide* Mayhew's work on *The London Poor*.

mankind through its organization of Health Boards and the institution of a system of health inspection are among the most important and unselfish of its labors in behalf of humanity and civilization.

The last decade of this century showed a marked degree of uplifting of public sentiment in regard to the treatment of moral offenders, due to an increased knowledge of mental science and the mental status of criminals and smaller offenders against law and order. Hanging was abolished in New York State and the electric chair substituted in its place. There is a growing sentiment in some States against capital punishment. The custom of employing young children in factories is restricted in most States of the Union and they are required to be sent to school. More charitable and humane measures are being introduced in the treatment of the condemned, and others charged with crimes and misdemeanors. Corporal punishment in the schools has largely disappeared; the prisons and poorhouses are made more comfortable; reform institutions for juvenile offenders are being established; and in one large penal institution in the State of New York (Sing Sing) a movement has been on foot to establish a school for the inmates to be taught by college graduate inmates. All such improvements in public sentiment must be accredited to the new mental science that has been unfolded by the advancement in the knowledge

of the physiology and pathology of brain and mind, which has thrown light on the status of criminals and the rationale of crime,—showing that moral delinquents are more sinned against than sinning. Exceptions there are, of course, to this advancement. Delaware still has her whipping post; New Jersey has her dungeons of solitary confinement; the Capitol of the United States herds its prisoners of both sexes together regardless of their offences; the blue laws of New England are still on the statute books; the wholesome pastime of ball-playing on Sunday is prohibited in New York; driving for pleasure on the Sabbath in Connecticut subjects the offender to arrest, etc.

An important movement was initiated in the State of New York in this decade in behalf of the care and treatment of epileptics. Heretofore the dependent epileptic drifted to the poor-house and lived and died there in the most neglected and impoverished circumstances. It would have been far better, wiser, and more humane to have subjected him to the electric chair than to have permitted him to rot to death in the loathsome poor-house. The number of this class of unfortunates had increased so alarmingly in 1890, in the State of New York, as to attract the notice of the civic authorities of the State, more especially of the Chairman of the State Board of Charities, the Hon. Oscar Craig, Rochester, N. Y. Through his influence, the fine Shaker farm at Sonyea, that State, consisting of 2200 acres of

arable land, was purchased by the State and converted to the use of a Colony for Epileptics, dependent and other. In this project, the humane labors of Mr. Craig were supplemented by the indefatigable zeal of the Hon. William P. Letchworth, Portage, N. Y., at one time a member of the Legislature of his State, and a man of large fortune; and it was largely due to his influence and his unselfish interest in behalf of epileptics that the success of this great and humane enterprise was assured.

The Board of the State Charity Association soon got to work and secured a medical superintendent of excellent professional attainments and of commanding executive ability, in Dr. William P. Spratling, of New York. Dr. Spratling was born at Opelika, Alabama, in 1862. In early life he devoted himself to industrial pursuits on his father's plantation, secured a common-school education, and drifted to Baltimore, Md., where he entered with zeal upon the study of medicine at the College of Physicians and Surgeons, and in due course received the degree of Doctor in Medicine from that institution. Leaving Baltimore, he secured in 1885 a position as first assistant physician in the Hospital for the Insane at Morris Plains, N. J., the most prominent institution of its kind in New Jersey. His experience there was a fit preparation for the Colony, of which he became medical superintendent in 1892, after a brief sojourn and study of a similar insti-

tution in Europe, particularly the Colony for Epilepsy at Bielefeld, Germany, in accordance with the plan of which the colony at Sonyea was established.

Dr. Spratling has made an enviable name and place for himself in his great work at Craig Colony. In 1904 he had one thousand cases of the most pronounced types of epilepsy in his charge, and the number was increasing as fast as there was room or a place for them. He reports a cure of about five per cent. under the Industrial System of treatment at the colony. His treatise on "Epilepsy," which was published in 1905, while adding nothing new to the solution of the enigma of the malady, or means for its cure, is perhaps the best work on the subject that has appeared in any language. The pathology of the disease is ably treated therein and brought down to date by the learned Dr. Thomas P. Prout, for many years Pathologist at the New Jersey State Hospital for the Insane, and, later, Pathologist at Fair Oaks Sanatorium, Summit, New Jersey, which was founded in 1901 by Dr. Eliot Gorton, formerly first assistant physician to the above named Hospital for the Insane.

The nature or proximate cause of epilepsy has baffled the greatest minds in the profession from the beginning. With the advent of modern methods of investigation, scores of the best minds of the profession have searched for its causation. Its symptoms, course, and varieties are known by

heart. Every part of the epileptic brain has been under the minutest post-mortem study with the most powerful microscope. But the only progress that has been made has been to locate the seat of the malady in the cerebral cortex, involving the sensory-motor centres. But how or why or in what way, is a mystery as deep now as it was centuries ago. The more refined and discriminate methods of treating the malady to-day are no more successful than the crude methods of old. The vaunted virtues of bromide of potassium in the cure of the disease are fictitious. The out-door life, a judicious regimen, and congenial occupation, such as the colony plan affords, have given better results than any other form of treatment. Except to relieve suffering and ameliorate and perhaps avert a critical crisis, existing medication is of little avail.

The conclusion to which all the more conspicuous writers on nervous diseases have come on this subject is that epilepsy is a disease having its chief causation in ante-natal influences; and that a large percentage of epileptic cases have alcoholic parents, and that about eighty percentum of them can be traced to that and other hereditary causes. The opinion of the distinguished Lombroso, that genius and epilepsy are closely allied, has not met with general acceptance. Gowers of England, Nothnagel and Oppenheim of Germany, Fèré, Voisin, and Régis of France, and Dana and others of New York, all declare that the disease has its

Florence Nightingale

From a statuette of Parian marble now in the Johns Hopkins Hospital School for Nurses. It was modelled by a sister of Sir Henry Bonham-Carter about 1860, and presented by him through Dr. D. C. Gilman, then President of the Johns Hopkins University, to the Hospital after having been exhibited at the World's Fair in Chicago, 1893

primary—similar or dissimilar—causes in heredity. Statistics collected by the Craig Colony support the same conclusion.[1]

It is worthy of note that in the year 1900 a movement was initiated under the auspices of the Medical Superintendent and Faculty of Craig Colony for the more systematic study of epilepsy. A society was formed having its medical superintendent as its secretary, called the National Association for the Study of Epilepsy and the Care and Treatment of Epileptics. The association soon grew to august proportions, enrolling among its members physicians from nearly every State of the United States. Its annual reports are voluminous and instructive. While they confirm the conclusion generally entertained by the modern neurologists as to the causation of the disease, they have thrown no light on its nature. That could hardly be expected in the present state of psychology. Knowledge of the psychical or cerebral functions is still in a preliminary stage of development, and until that is perfected, a full understanding of the disorder or derangement of such functions must necessarily be held in abeyance.

The Roentgen ray, so called from the name of its celebrated inventor and discoverer, came into prominence early in this decade. At the outset, much was expected from its use in therapeutics,

[1] *Vide* Spratling's *Epilepsy*, ch. iv., p. 58, in which the etiology of the disease is discussed and authorities cited.

especially in the local malignant maladies, but it has not met the full expectation of its exploiters in that direction. In surgery, however, it has proved to be a most useful means of diagnosis and procedure. Through its power to illuminate interior parts of the organism, it has also proved useful in the diagnosis of certain diseases of the chest and joints. By its aid the surgeon acquires a degree of certainty in the diagnosis and treatment of fractures and dislocations which he did not possess before, and would not be justified in dispensing with now. This ingenious device for isolating the blue or violet ray has therefore become a necessary adjunct to every hospital and laboratory.

We cannot perhaps more fittingly bring this volume to a close than by giving a brief summary of the state of general medicine at this time.

We have given a brief account in Chapter XVII of the brilliant researches and demonstrations of the illustrious Pasteur, in the domain of bacteriology, especially in establishing the germ theory of infectious diseases and the true method of treating them. Apart from surgery, the profession has been slow in profiting by the demonstrations of Pasteur in therapeia; nevertheless, its students have been at work, and with an industry characteristic of the scientific mind, have pressed steadily forward in their researches into the therapeutics of Immune Medication. The results that have been achieved in the first decade of the twentieth

century are of momentous interest. No practitioner of medicine, busy with his cases, can have any adequate conception of the extraordinary progress that has been made during the present decade, much less of that in prospect in the decade to come.

Following the death of the lamented Pasteur, the whole medical world took up the hunt for germs of the specific affections, and one by one have they been found. The work of the Pasteur Institute at Paris was continued under the distinguished Metchnikoff, whose researches into the *flora* of the intestinal tract are among the most brilliant. In this field of exploitation Germany furnishes a multitude of collaborators. The studies of these savants go to show that we shall have to revise the dogma as to the danger of eating food undergoing putrefactive changes. In an elaborate review of this subject in *La Tribune Médicale*, for March, 1909, M. Metchnikoff says:

Later, when we came to study the diseases due to certain foods, and interpret them as intoxications of alimentary origin, it was found that in a great majority of cases these conditions were not the results of the action of putrid substances, nor of any intoxication, but simply were due to an infection by a group of microbes which were intermediaries between the colon bacillus and the typhoid bacillus—microbes which were derived from diseased butcher's meat. When this was discovered, the danger of eating putrefied food began to be doubted. But it was

remembered that some nations could eat without the slightest inconvenience game and cheeses in a state of putrefaction, and that certain races, such as the Indo-Chinese, the Malays, the Polynesians, and the Greenlandians, had a marked preference for putrid fish and meat.[1]

Therein is opened a wide field for savants of the future to harvest.

Dr. Robert Koch, of Berlin, following the same line of investigation as Pasteur, discovered in the previous decade the germ of tuberculosis. Cultures from the germ and serums have been made and administered to tuberculous cases, with what results, however, it is too soon to express an opinion. It is altogether probable that at last a specific for the dreadful plague, the white plague, that for centuries has swept off one fourth of the human race, has been found.

The micro-organism of pneumonia was isolated by Frankel and Weichselbaum in 1885, antedating by a brief period Koch's discovery of the comma bacillus of tuberculosis; that of typhoid fever was isolated by Eberth in 1880; the micro-organism of tetanus was discovered by Nicolaiel, in 1884, and serums were made from it by Kitasato and Behren; the infectious germ of gonorrhœa—the gonococcus — yielded its secret to Nissl, in 1879; and that of yellow fever, the great scourge of the South in summer time, Sanarelli claims to have discovered in the bacillus icteroides. Fol-

[1] Personal knowledge.

lowing the studies of M. Pasteur by M. Metchnikoff, the offices of the leucocytes and phagocytes of the blood were discovered in this decade, which marked an important advance in physiological therapeutics. Acting on this disclosure of Professor Metchnikoff, Professor Vaughn of the University of Ann Arbor discovered a method of augmenting the leucocytes, and their protective agency in the blood, in an animal product known as nuclein, a substance to be found in various glands of the body. The Messrs. Parke, Davis & Co. of Detroit have distinguished themselves in being the first to exploit this remedy, of which they prepared solutions both for hypodermic injections and oral administration. These gentlemen claim, with a consistency perfectly logical, that "since the germicidal property of normal blood resides in the substance known as nuclein, and since this is derived from the nuclei of certain cells of the blood, the white corpuscles, it is evident that by increasing the number of these cells very materially the germicidal power of the blood plasm may be considerably heightened. And, knowing that the capacity of tissue resistance to pathogenic bacteria is in direct proportion to the number of white corpuscles (and their approach to the normal), and that the active element is nuclein," they feel justified in making artificial additions to the "defensive proteids" when, on account of disease, these are lacking.[1]

[1] *Medical News*, February 27, 1897.

The following are the conclusions of Professor Vaughn in his own words.

1. The phagocytic theory of Metchnikoff, in so far as it teaches that the polynuclear white blood-corpuscles are active agents in preventing or retarding the multiplication of pathogenic germs in the body, is true.

2. The polynuclear corpuscles do not eat the bacilli, but they destroy the germ by virtue of the chemical action of some constituent or secretion.

3. The germicidal properties of blood serum are due to a substance, or to substances, that originate in the polynuclear white blood-corpuscles.

4. The natural resistance of the body to bacterial disease will be strengthened by a physiological increase in the production of polynuclear white blood-corpuscles.

5. This increase in the polynuclear corpuscles may be induced by introducing into the animal the most distinctive constituent of these cells, which is nuclein.

The specific virtues of antitoxin, or the culture of Kleb-Loeffler's diphtheritic bacillus, has been established beyond rational doubt. The objectionable features of the serum have been removed by improved and more scientific methods in its preparation, and certitude as to dosage, with the effect to eliminate the element of danger from its administration which attended its first introduction. The success of its use in New York leaves no room to doubt its efficacy when

not too long delayed. Opinions as to its efficacy in London are decidedly in its favor. The London *Lancet* for November 4, 1805, a very conservative journal, says its success has

passed beyond the stage of doubt. In the opinion [it declares] of almost all those who have studied this question apart from preconceived bias, the treatment of diphtheria by antitoxin has passed beyond the stage of doubt as to its efficacy to the position of an established and approved therapeutic method. That this attitude of confidence is justifiable can scarcely be doubted.

This opinion was given more than ten years after its introduction in London, and was supported by citing statistics from the report of health officers and hospital authorities. Continuing the subject the editor says:

We find that among cases treated with antitoxin at the Brook Hospital on the first day of the disease, at its very outset, the mortality for the six years—1897–1902—was *nil*. Among those treated on the second day, the mortality was under 5 per cent.; while among those in which treatment was delayed to the fourth and later days, the percentage rose to about 20. . . . In order that the antitoxin may be enabled to exert its beneficent action, it must be administered before the poison of the disease has had time to obtain a firm grip of the living cells. If the remedy is given at the very outset, the poison is neutralized before it can do serious harm, and recovery of the patient is practically certain.

Koch has further distinguished himself in confirming the discovery of the cause of the "Sleeping Sickness," *Trypanosomiasis*, a disease which prevails in Equatorial Africa. This was an achievement of the twentieth century. He found that the malady was due to a micro-organism, and succeeded in isolating it—a different species of bacilli than had heretofore been discovered. Dr. Robert Koch, by his labors in bacteriology, has made his name as familiar as household-words throughout Christendom. He was born at Klaustal in 1843, and began the study of medicine at an early age. In 1880, he headed the German expedition to Egypt and India to investigate the cholera epidemic that raged in those countries, in which he signalized his genius in the discovery of the cholera bacillus. He has long held a prominent position on the Board of Health, Berlin, Germany. Dr. Koch was for a period skeptical of the verity of M. Pasteur's demonstrations of micro-organisms, but became ultimately an ardent supporter of them.[1]

Some time before (1880), Eberth had discovered the typhoid germ, the little animal that has for centuries caused the awful ravages in Peyer's glands. It is a question, by no means decided, whether the germ of typhoid is the sole cause of that fever, or not. Cultures of this organism have been prepared, but the results of their admin-

[1] See *Life of M. Pasteur*. Dr. Koch died since this volume went to press.

istration have not been tabulated in sufficient number to justify an opinion as to the efficacy of the vaccine.

The serum of the anti-gonococcus is made from blood of strong, healthy rams in accordance with the method of Dr. J. C. Torrey of the Loomis Laboratory, New York, the details of which were given in a paper read before the Congress of American Physicians and Surgeons which met in Washington, D. C., in May, 1907.[1] Dr. Torrey, with others, reported in the following year six cases of the disease, of both sexes, in which the anti-gonococcus serum was eminently successful. An account of these cases was given in detail in a paper read March 7, 1908, before the Memphis and Shelby County Medical Society. The pharmacologists of Europe and America have made cultures of all these micro-organisms; but statistics of the clinical results of their exhibition are not yet such as to warrant a positive declaration as to their usefulness. The deadly staphylococcus and streptococcus of pyæmia have been isolated and are in the hands of pharmacologists throughout the world for the preparation of serums from them. As with the cultures of other micro-organisms, it is too soon to declare what degree of usefulness these may serve the ends of scientific medicine. The micro-organism of tetanus was discovered in the last previous decade by Nicolaiel. More recently serums

[1] Published in the *Journal of the American Medical Association.*

have been prepared and experiments made with its use. Two cases were reported in the *American Practitioner and News*, June, 1900; one in the *Medical Mirror* of December of that year; several in the *Medical Council* for April, 1902; and one in Gaillard's *Southern Medicine*, August, 1907. A writer in the latter journal gives an account of a case of tetanus in a laborer who had had his foot punctured by a nail and was cured of the malady by the antitetanic serum. He declares his belief that the serum is "just as advantageous to a patient suffering from tetanus as antitoxin is to a case of diphtheria." If that be true, the question of a cure for tetanus is settled.

Another phase of micro-organo-therapeia was discovered in this decade which seems likely to have an important influence on the theory and practice of immune medication, especially of the leucocytes and phagocytes of the blood as advanced by Metchnikoff in his "Nature of Man." We refer to a method of modifying the blood fluids so that they become better able to protect themselves against bacterial invasion. All know how wise is Nature, or the presiding genius of the organism, in defending itself from morbific causes. MM. Denys and Leclef showed, in 1895, that "when rabbits were immunized against streptococcus pyogenes the serum acquired but slight bactericidal properties; but that such serum, when brought in contact with the leucocytes of normal immunized rabbits,

greatly enhanced their phagocytic activity." Mennes obtained similar results in experimenting with the blood serum of guinea-pigs treated with cultures of the pneumococci. The subject has been followed up by others. Sir A. E. Wright, whose bacteriological laboratory is the first, perhaps, in London, and his collaborator, Douglas, among other investigators, made a study of it, and were able to show that where phagocytes were brought in contact with suspensions of cultures of staphylococcus pyogenes, the blood fluids were able so to modify the bacteria as to render them a prey to the phagocytes.

The effect thus described may be expressed in a single word, by the Latin verb opsono, meaning "I cater for," or "I provide for"; in Greek, by the noun ὀψώνιον, that is, any substance which serves as food for bacteria for the phagocytes to consume, and thus to protect the sanity of the blood of a victim of bacterial invasion. The following summary of our knowledge of the opsonins is from the pen of Dr. Ross in the London *Lancet* for November, 1906.

First, opsonins act by chemically uniting with the invading bacteria, and so altering them that the leucocytes are able to phagocyte the bacteria and destroy them. It is important to remember that these substances do not stimulate or otherwise affect the leucocytes.

Second, it is probable that there are present many varieties of opsonins in the blood plasm, each having

to do with combating a particular kind of microbic invasion.

Third, opsonins have been shown to be distinct from the bacteriotropic substances, such as the bacteriolysins, the agglutinins, and the antitoxins.[1]

It is interesting to observe that a method has been devised by which the opsonic powers of an individual may be determined with approximate certainty—that is to say, whether the protecting opsonic subject be normal, above or below normal, so that the dose of the needed serum may be adjusted accordingly.[2]

The rules which Sir A. E. Wright of London lays down for the treatment of bacterial infections may be briefly stated in his own words:

1. Isolate in pure culture the causative micro-organism.

2. Estimate the opsonic power of the patient's blood to this micro-organism.

3. If the opsonic index be at or below normal, prepare and standardize a vaccine from this micro-organism.

4. Inoculate the patient with this vaccine with appropriate doses and at proper intervals as shown by a systematic estimation of the opsonic content of the patient's blood.[3]

[1] Quoted from the *Therapeutic Gazette*, January 15, 1907, from an interesting article by E. M. Houghton, Ph.D., M.D., University of Michigan.

[2] *Vide* E. C. L. Miller's lucid paper on the subject in the *Therapeutic Gazette*, as above cited.

[3] *Ibidem.*

The humoralism of Hippocrates finds ample confirmation in the researches of etiologists of modern times. The *flora* of the intestinal tract abounds with countless varieties of bacilli in health and disease which get into the blood more or less. Most forms of gastric derangements, including the choleras, infantile and other forms of them, have presumably often their etiology in micro-organisms. Many bacteriologists who are studying this course of morbific causation, while admitting their presence in the intestines of all adults in menacing quantities, deny their presence in the intestines of infants, maintaining that the choleras and other forms of indigestion in infants are due to chemical interactions in their food and to faulty metabolism. Be that as it may, they find their way into the fluids and corrupt them. The indication of treatment is the same in each case, namely, elimination—correcting errors of diet, and the use of asepticized dilutions. There is no school of medicine, or system of practice, that is not profoundly affected by these discoveries—and they are still in the initiatory stage of development. The results obtained from researches in morbific germ-causation at this period are prophetic of indefinite extension in the near future, presaging that the dreams of M. Pasteur will be more than fulfilled.

The closing years of the nineteenth century were marked, as we have observed, with increased impetus for scientific research. The spirit of

discovery which dominated the genius of Pasteur spread like a contagion, increasing in force and volume with the years. The conviction was widespread in the minds of the profession that the etiology of all infectious diseases was to be found in living germs—micro-organisms. The search for the offending bacillus was, therefore, prosecuted with vigor. In 1897, the eminent bacteriologist, Giuseppe Sanarelli, announced the discovery, by him, of the long-looked-for micro-germ of yellow fever, which he called the bacillus icteroides.[1] The alleged discovery was hailed with enthusiasm by the medical world. But it was premature; the micro-organism of that scourge continues still to elude discovery.

In the early century (nineteenth), yellow fever, termed fiebre armarilla, in Spanish, was very generally regarded a contagious disease. A few among the more experienced in its epidemics combated that opinion, Dr. Joan Devèze of Philadelphia, in 1793, being the first to assert its non-contagious character. The serious epidemic of yellow fever which raged during the summer of that year at Philadelphia gave the profession of that city ample opportunity to study the phenomena of the malady, and to determine with proximate certainty the truth of its contagious or non-contagious character. The conclusion was decidedly adverse to the

[1] First announced in the *British Medical Journal* for July 3, 1897.

theory of its contagiousness. The eminent Dr. Benjamin Rush, who had formerly maintained the opposite view, confessed his error and publicly gave his adhesion to the views of Dr. Devèze. He even went so far as to express contrition for the evils that had befallen humanity by the publication of his earlier opinion as to the contagiousness of the disease, and to regard no personal sacrifice that he could make too great to correct them. Nevertheless, health authorities still continued, and do now continue, to regard the disease contagious, to quarantine its victims, and to send sporadic cases of it to the pest house outside the cities, to die, or live as they may. Such was the cruel fate of Professor Richard Proctor, the distinguished English astronomer and mathematician, who a few years since fell ill with yellow fever, and was hurried out of a hotel in New York to the pest house where he died. The neglect of such cases, through fear of the contagion, has been the occasion of more deaths, it is safe to say, than the disease would have caused if left to itself.[1]

LATER DEMONSTRATIONS IN THE ETIOLOGY OF YELLOW FEVER

The heroism displayed in the investigation of the etiology of yellow fever is not surpassed in the annals of scientific research. It has long

[1] *Vide* Dr. la Roche's comprehensive work on the *Yellow Fever*.

been believed that the mosquito was the agent of its transmission. To Dr. Carlos J. Finlay of Havana, at one time President of the Superior Board of Health of Cuba, belongs the credit of being the first to announce the belief that the mosquito carried the virus of the disease from patient to patient, and that infected clothing, fomites, of fever cases had no part in it; that it was the proboscis of that insect that had previously stung and extracted blood from a yellow-fever patient, and then bitten a victim, that was the direct, immediate, and exciting cause and occasion of its propagation. He claimed to have discovered the micro-organism of the virus, and named it the micrococcus tetragenus. He *believed* that the mosquito was the agent, the host, so to speak, of the virus's transmission, but he did not prove it. That fact remained for a genius of a different order to accomplish.

In 1899, General Sternberg, Surgeon-General of the United States Army, who had seen much of yellow fever in Cuba, thought he had reason to doubt the genuineness of Signor Sanarelli's discovery of the true micro-organism of that malady. He accordingly appointed Dr. Walter Reed and Dr. James Carroll of the army to investigate the claim of Dr. Sanarelli. The results of this investigation, which was most conscientiously performed, disproved the finding of Dr. Sanarelli and showed that it was the bacillus choleræ suis, or hog-cholera bacillus, that that

gentleman had mistaken for the true germ of yellow fever.

In the following year, 1900, another commission was appointed from the officers of the United States Army, at Havana, for the purpose of investigating yellow fever, consisting of Dr. Reed, Chairman, Dr. Lazear, Dr. Carroll, and Dr. Agramonte. All of these physicians were experienced in yellow fever and expert bacteriologists. The species of the mosquito selected for experimentation was the Stegomyia fascinata. After laying out their line of procedure, having dosed the mosquito with the blood of yellow-fever victims, the next step was to decide upon the persons to be bitten by her—(for it was a female). The choice fell upon two of their number, Dr. Lazear and Dr. Carroll, as the commission deemed it their duty to experiment upon themselves first, before submitting anyone else to the risk involved. The description of this first experiment will bear repeating verbatim in Dr. Carroll's own words:

The insect, which had been hatched and reared in the laboratory, had been caused to feed upon four cases of yellow fever, two of them severe and two mild. The first patient, a severe case, was bitten twelve days before, the second, third, and fourth patient had been bitten six, four, and two days previously, and their attacks were, in character, mild, severe, and mild, respectively. In writing to Dr. Reed, who was absent, on the night after the inci-

dent, I remarked jokingly that if there were anything in the mosquito theory, I should have a good dose; and so it happened. After having slight premonitory symptoms for two days, I was taken sick on August 31st, and on September 1st, I was carried to the yellow-fever camp. My life was in the balance for three days, and my chart shows that on the fifth, sixth, and seventh days my urine contained eight-tenths and nine-tenths of moist albumen. The tests were made by Dr. Lazear. I mention this particularly because the results obtained in this case do not agree with the twentieth conclusion of Marchoux, Salimbini, and Simond, that the longer the interval elapses after the infection of the mosquito the more dangerous he becomes. Twelve days, the period above cited, is the shortest time in which the mosquito has proved to be able of conveying the infection. It is my opinion that the susceptibility of the individual bitten is a much more potent factor in determining the severity of the attack than has the duration of the infection in the mosquito, or the numbers of mosquitoes applied. On the day I was taken sick, August 31, 1900, Dr. Lazear applied the same mosquito, with three others, to another individual who suffered a comparatively mild attack, and was well before I left my bed. Thus it happened that I was the first person to whom the mosquito was proved to convey the disease. On the eighteenth day of September, five days after I was permitted to leave my bed, Dr. Lazear was stricken and died in convulsions just one week later, after several days of delirium with black vomit. Such is yellow fever!

The conclusion that Dr. Reed came to upon

this and other similar evidence, as formally stated by him, was that "the mosquito acts as an intermediate host for the parasite of yellow fever"[1]

The commission did not cease its labors with the sacrifice of one of its most faithful members, the martyred Lazear. It wished to put its demonstrations beyond the cavil of the most adverse critic. Accordingly, its inspired chairman called for volunteers to continue its experiments, in response to which two young men from the ranks of the American Army, both non-immunes, promptly came forth and offered their services. Their names were John R. Kissenger and John J. Moran, both from Ohio. Their names deserve to be immortalized. Dr. Reed, the chairman of the commission, pointed out to them the risk they ran, the danger to life and health they incurred in the experiment; still they were not deterred. The chairman then told them that a sum of money would be put at their disposal, which each declined to accept, declaring that it was a service which they tendered "solely in the interest of humanity and the cause of science." Surely, science hath her heroes no less than war!

These young men, together with several others, all non-immune, submitted themselves to the bites of infected mosquitoes, the most of whom went through the ordeal of yellow fever, one of the most virulent and deadly diseases known to

[1] *Etiology of Yellow Fever.* Address before the American Health Association, Indianapolis, October, 1900.

history, thus adding further evidence in support of the contention that the fever germ is stored in and transmitted by the mosquito.

The non-contagiousness of the disease, however, was yet to be demonstrated. Dr. Reed, of the Commission, resolutely maintained that fomites had no part in the transmission of yellow fever. "Yellow fever can no more be transmitted in that way than intermittent fever," he declared. To demonstrate the truth of this conviction, he had a building suitably isolated and prepared at Columbia Barracks, Quemados, Cuba, filled with bed and other clothing that had been soiled by yellow-fever cases, and invited volunteers from the army to occupy them. Dr. Robert P. Cooke, Acting Assistant Surgeon, U. S. A., and two privates of the hospital corps, Falk and Jernigan, all non-immune young Americans, promptly assented to take the risk of occupying the supposed infected building the required time—twenty days. The preparations for the test may be the better given in Dr. Reed's own account of it, from the Indianapolis address, already referred to, on the etiology of yellow fever.

On November 30, 1900, the building being now ready for occupation, three large boxes filled with sheets, pillow slips, blankets, etc., contaminated by contact with cases of yellow fever, and their discharges, were received and placed there. The majority of the articles had been taken from the beds of patients sick with yellow fever, at Las Animas

Hospital, Havana, or at Columbia Barracks. Many of them had been purposely soiled with a liberal quantity of black vomit, urine, and fæcal matter. A dirty "comfortable" and much soiled pair of blankets, removed from the bed of a patient sick with yellow fever in the town of Quemados, were contained in one of these boxes. . . .

On the same day the volunteers referred to entered the building and

deliberately unpacked these boxes, which had been tightly closed and locked for two weeks. They were careful at the same time to give each article a thorough handling and shaking in order to disseminate through the air of the room the specific agent of yellow fever, if contained in those articles. These soiled sheets, pillow cases, and blankets were used in preparing the beds in which the members of the hospital corps slept. Various soiled articles were hung around the room and placed about the bed occupied by Dr. Cooke.

Such were the quarters in which these brave members of the hospital corps slept for a period of twenty days, being allowed to occupy a tent nearby, however, during the day. Yet they all escaped the yellow fever, and received no material injury to their health. The test would seem to be conclusive, and the truth of the non-contagiousness of yellow fever to have been established.[1]

[1] For this account of yellow fever, we are indebted to the admirable volume of Professor Howard A. Kelly, M.D., of Johns Hopkins University, entitled "Walter Reed and Yellow

The career of Walter Reed will not suffer in comparison with the most brilliant and self-sacrificing heroes in medical history. He was a Virginian, born in Gloucester County, 1851, and died in 1902. His life may be compared to a meteor, which rises suddenly and shines with great brilliancy for a brief period and suddenly disappears.

When a youth Reed entered the University of Virginia as a medical student. At the age of sixteen he foresaw the probability that he would have to leave the university at the close of another year, and obtained the promise of its Dean that if he were able to pass the required examinations at the end of that year he should have his coveted diploma—a promise reluctantly fulfilled, since he was only seventeen. Coming to New York a few months later, he matriculated at Bellevue College Hospital, and the following year took the degree of Doctor in Medicine of that institution. Thence he became connected with the Health Department of the City of Brooklyn, from which he drifted into the medical department of the United States Army and was sent to the far West; later he was transferred to the East, where, with all his other duties—for he neglected no duty—we find him studying pathology and bacteriology at Johns Hopkins

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Fever," 1906. While the volume is an affectionate tribute to one of the noblest of men, it is at the same time a lucid and valuable contribution to the subject of which it treats.

University, under the distinguished Professor Welch, still retaining, however, his connection with the United States Army. Every new advancement in his career was in line with the ultimate purpose of his life and fitted him the better to fulfil its requirements. Professor Welch, whose pupil he was at Johns Hopkins, thus spoke of him in 1895:

It is one of the greatest satisfactions and pleasures of my life to have enjoyed the relations of teacher and of friend with a man who has left a memory so respected and beloved, and who has conferred such inestimable benefits upon his country and on mankind as Dr. Reed.

The war of the United States with Spain in 1898 gave Dr. Reed an opportunity to complete the work in the department of medicine to which he had been fitted, namely, the investigation of the etiology of yellow fever. Being sent to Cuba with the army in 1898, Dr. Reed entered upon this work with all the enthusiasm of youth. Nothing, perhaps, showed the scientific enthusiasm of the man, and his self-sacrificing love of truth, more than the letter which he wrote to his wife after the first demonstration of the source of yellow fever, even though it resulted in the death of his beloved colleague, Dr. Lazear:

I do not exaggerate [he writes, in a letter of December 9, 1900], I could shout for very joy that

Heaven has permitted me to establish this wonderful way of propagating yellow fever. It was Finlay's theory, and he deserves great credit for having suggested it, but as he did nothing to prove it, it was rejected by all, including General Sternberg. Now we have put it beyond cavil, and its importance to Cuba and the United States cannot be estimated. Major Kean says that the discovery is worth more than the cost of the Spanish War, including lives lost and money expended. He is almost beside himself with joy and will tell General Wood when he goes to town this morning. To-morrow afternoon we will have the Havana Board of Experts, Drs. Guiteras, Albertini, and Finlay come out and diagnose the case. I sha'n't tell them how the infection was acquired until after they have satisfied themselves concerning the character of the case, when I will let them know. . . .

At the very close of the nineteenth century, Dr. Reed again writes:

Only ten minutes of the old century remain. Here have I been sitting reading that most wonderful book "La Roche on Yellow Fever," written in 1853. Forty-seven years later it has been permitted to me and my assistants to lift the impenetrable veil that has surrounded the causation of this most wonderful, dreadful pest of humanity, and to put it on a rational and scientific basis. I thank God that this has been accomplished during the latter days of the old century. May its cure be wrought out in the early days of the new! The prayer that has been mine for twenty years, that I might be permitted in some way, or

at some time, to do something to alleviate human suffering, has been granted.[1]

Dr. Reed died suddenly and unexpectedly after an operation for appendicitis November 22, 1902, the recipient of tributes of respect from learned societies and institutions, and loved and honored by all who knew him. Over his grave at Arlington stands a shaft of Quincy granite, with an oblong bronze tablet, bearing the following inscription (among others):

He gave to man control over that dreadful scourge, Yellow Fever.

Dr. Walter Reed belonged to the highest type of a medical man. His contributions to medical science are a lasting monument to his genius; his life a model for the student of medicine to emulate. In bringing his character and achievements into clear view, Professor Kelly has been just to his friend and colleague and true to the cause of medical progress throughout the world.

PROGRESS OF PHARMACOLOGY

It seems to be a provision of progress that coordinate branches of science should advance together. The advancement of our knowledge of micro-organisms and the part they play in the causation of disease would be of but little use without a knowledge of means and methods

[1] *Walter Reed and Yellow Fever*, p. 149.

to combat and destroy them. This desideratum has happily been met to some extent in the corresponding advancement of our knowledge of pharmacy, pharmacology, and pharmacognosy. The development in these departments of therapeutics and materia medica is one of the many wonders of the closing decade of the nineteenth century. It would be a pleasant task to the medical historian to give just credit to all the laborers in this field of research by making brief mention of the name of each with his special contribution. To do that, however, would greatly exceed the limitations of this work. Unfortunately, we can write only of achievements, and incidentally of persons in this connection.

The development of pharmacology has been a growth of the last half century. In the United States it began with the establishment of the New York School of Pharmacy in 1831, by a score of enterprising druggists who foresaw the ultimate need of a growing profession, and generously took measures to meet it. Of the origin of that movement we have given a brief account on a previous page. That school supplied clerks for the druggist and apothecary qualified in a small way to compound, with more or less accuracy, the crude prescriptions of physicians. As the demands of the profession continued to increase, the drug-stores had to augment their capacity to meet it. This condition soon led

to the formation of wholesale pharmacists in many of the principal cities of the world—more notably the English-speaking world. These supplied the retailing druggists, and these again, the physicians. From these humble beginnings grew the mammoth pharmacies of the country, with their improved means of preparing medicines for accurate, easy, and convenient administration. Among the more notable of these may be mentioned the houses of Schieffelin & Company, Squibb, McKesson & Robbins, Fraser & Co., Merck, Johnson & Johnson (surgical supplies), Boericke & Runyon, Boericke & Tafel (homœopathic), of New York and Philadelphia; Wyeth & Brother, Mumford & Co., Henry K. Wampole & Co., of the latter city; Sharpe & Dohme, of Baltimore; Stearns & Co., Parke, Davis & Co., Detroit; Battle & Co., of St. Louis; and many others. These were manufacturing chemists, and were amply supplied with the chemical talent of their generation. With the progress of science, physiology gradually gained an ascendancy over chemistry. These institutions were compelled, therefore, to add a physiological laboratory to their chemical department, for the purpose of inquiring into the physiological effects of drug-remedies, the sphere of their activities, and their specific relations to health and disease. For this last purpose they set the whole profession at work experimenting with new remedies, first testing them on the lower animals, in accordance with the

method introduced by Messrs. Parke, Davis & Co.

Meantime, French savants had been at work in the domain of the infinitely little, which began in the seventh decade of this century, and resulted in the evolution of Louis Pasteur, whose discoveries and demonstrations may be said to have revolutionized the theory and practice of medicine, as we have already shown. The pharmacies were no longer able to meet the large demands of the profession of medicine, not to mention surgery, and were compelled either to tear down their old laboratories and build new and more elaborate ones, or to remodel and greatly enlarge the old ones. The time had come when pharmacological establishments were to be evolved into institutions for the study of experimental medicine, the assaying of drugs, and the scientific preparation of biological products. Such as were not able to meet this new want and to adapt themselves to the new conditions must needs go out and give place to the younger and more enterprising.

We cannot perhaps present a more succinct and lucid account of the marvellous development of modern methods in pharmacology than to give a few details of one of these modern establishments. That of Parke, Davis & Co. of Detroit, United States, is perhaps the most conspicuous. Its department of experimental medicine embraces chemistry, materia medica, therapeutics, bacteriology, botany, physiology,

physiological chemistry, toxicology, toxicohæmia, pathogenesis, pharmacology, analytic chemistry, etc. The department of experimental medicine consists of a number of subordinate departments or sections, each in charge of an eminent expert in the special subject assigned to that section. These include bacteriological research, physiological chemistry, serum research, histological and pathological investigation, chemical and pharmacological research, the physiological assay of drugs, the study of plant bacteriology, etc. This last department is provided with a complete reference library and herbarium.

The section devoted to histological and pathological research possesses a freezing microtome, fitted for the use of carbonic anhydride as a refrigerant, employed to cut fatty tissues, the collodion-embedding method being used for hard tissues. An exceedingly fine paraffine microtome cuts sections one twenty-five-thousandth of an inch in thickness. Sterilizers, paraffine baths, microscopes, and accessories for the examination of pathological specimens are supplied in this section.

The chemical and pharmacological section is devoted to the subject of germicides, insecticides, sheep and cattle dips, and disinfectants; also animal products and extracts and certain special aseptic pharmaceutical preparations, as ergone, veratrone, and digitalone. This section also investigates the physiological action of new drugs,

chemicals, and biological products by experimentation upon animals.

The physiological assay of drugs is a most interesting field of research, and we take the liberty to quote verbatim the advantages and usefulness of the process, as set forth in the monograph kindly furnished us by the enterprising proprietors to whom we have referred.

It is known that active drugs have definite physiologic effects upon animals and man. They have also certain recognized therapeutic effects upon human beings suffering from disease. The action of a drug upon a healthy animal, and the action of the same drug upon a human being, in health or illness, may be similar, or may be dissimilar to the extent of marked contrast. For example, a drug that produces a definite effect upon the frog or the cock will not invariably yield the same, or even similar, results in human beings, sick or well. However, it has been found that a trustworthy specimen of a drug, that yields its characteristic physiologic effect upon an animal, will also yield its characteristic effect upon a sick man.

It is perfectly obvious that the physiological standardization of drug-remedies is an important desideratum. Without it certitude in therapeutics is nil. The writer, whom we have quoted above, gives an illustration of the standardization of drugs which is interesting. It is altogether a modern feature of pharmacology. He says:

Good ergot will blacken the comb of a Leghorn fowl, and the same specimen will raise the blood pressure (vasomotor stimulation) and cause contraction of the uterine muscles of the human being. Poor ergot will do neither. Each is a metric indication of the quality of the ergot. It is not necessary that the effect be the same in both cases. The physician has the assurance, however, that a physiologically standardized preparation of ergot, *i. e.*, one that will blacken the cock's comb, will also cause uterine contractions. He does not have that assurance when he employs a preparation that is not physiologically standardized, for there are no other reliable means of assaying this drug. The only way its strength can be determined by the physician is to test it upon his patient, a test liable to be made under circumstances that do not justify experiment.

Another important feature of modern pharmacology is the institution of the Vivarium. This conception of modern pharmacology was M. Pasteur's, but in his day it was at first the crudest and most forbidding sort of place, as we have observed. In the institution which has come under our special observation, the vivarium is a most interesting department of experimental medicine, shorn of its most repellent features. Here are pleasant and wholesome quarters, fitted up for the proper care of the animals to become victims of vivisection. Here are housed a variety of animals of various species, embracing horses, heifers, sheep, goats, dogs, rabbits, swine, guinea-pigs, frogs, pigeons, rats, mice, etc. The apartments are large and airy,

with cemented floors, painted walls, thoroughly ventilated and lighted, drained, and scrupulously clean and neat. From a sanitary point of view the homes of the working classes of America would not compare with the apartments of this modern vivarium.

The older members of the profession could not but be profoundly impressed with the contrast between the method of preparing cow-pox virus in these modern institutions and that of the middle century, when the only available means of supply was the arm-to-arm practice; and the supply was kept from exhaustion by the preservation of the scab of some child's arm, the pus that had dried and been cast off and preserved. These scabs or "crusts," as they were more politely termed, were often sold to the health inspector of the district, sometimes at the price of five dollars apiece, which he in turn doubled upon by retailing them to ignorant country physicians for use among his more ignorant and trusting patients.[1] Now all is changed. The cow-pox culture is derived from inoculations of heifers, carefully selected from healthy specimens. They are confined in wholesome quarters and kept scrupulously clean. The virus is garnered with clean hands, and put up, under conditions thoroughly asepticized, in glass tubes.

The method of making and preparing for the trade, antitoxin, or horse-serum, now so generally

[1] Personal recollections and observations.

used in the treatment of diphtheria, is even more scrupulous and exact. The horse, after having passed the veterinary's examination, and found free from disease, is as carefully prepared for inoculation with the serum of Loeffler's bacillus as a patient in a hospital before undergoing a serious surgical operation. The animal is kept immaculately clean and carefully stalled and fed for a few days before being subjected to the serum. But the same degree of care is given the horses after inoculation and during the development of the toxin as before. He must be regularly groomed, and taken out for exercise daily; temperature and pulse-rate looked after by men whose business it is. This care to obtain antitoxin of perfect quality for so fatal a malady as diphtheria is, in the highest degree, commendable; and we cannot but believe that if the human animal were as scrupulously and intelligently taken care of as are these horses, there would be no need of antitoxin, for there would be no diphtheria.[1]

The study of plant bacteriology, which has been carried on under the auspices of pharmacology in laboratory work, has led to most important discoveries as to the uses the little bacillus plays in agriculture, and affords another illustra-

[1] The author is indebted to the courtesy of Mr. George E. Cornell, of Parke, Davis & Co. for valuable data upon modern pharmacy and allied subjects, for which he desires to express his thanks.

tion of the progress of science. It has been known since the demonstrations of M. Pouchet, that myriads of bacteria infect the air and settle upon everything; but it is a recent discovery that bacterial germs collect and store nitrogen, and that, therefore, they subserve high uses in the economy of nature. The bacteriologists obtain them from the leaves of plants, and by isolating them and by platings, secure pure cultures. These are used to fertilize the soil at the time of seed-sowing. Companies have been formed to utilize this discovery in the manufacture of fertilizers; but our knowledge of the subject is entirely due to laboratory work, carried forward on the magnificent scale of modern pharmacology.

The outlook for scientific medicine was never so auspicious as it is at the close of the nineteenth century. Its progress has been through ignorance in high places and superstition in all places; but its advance, if slow, has been unbroken. The greatest obstacles it has had to encounter have been the hostility of the ecclesiastics to the discoveries and demonstrations of science, and ignorance and bigotry in its own ranks, among its own friends, in assuming the possession of knowledge, that they did not possess and that was not attainable at the time,—which is the worst form of quackery. It is clear to see now that all the collateral sciences bearing on animal life had first to be developed ere any certitude in therapeia could be attained and a science of Therapeutics

established. That grand desideratum is now within hailing distance, thanks to the labors of the unselfish and heroic. The future of medicine is by no means free of difficulties; there is still a great work to be done; but with each new decade the mists must lift and its course become clearer.

Finally, the studious inquirer has known from the beginning, that there never was, and never could be, but one science of medicine. That had its origin at Cos, in Eastern Asia, about 450 years B.C. in principles enunciated by the illustrious "Father of Medicine." Sects in medicine have come, and sects in medicine have gone with their zealots, but the Art Medical remains. Medical systems have risen and fallen but the science of medicine is still stable and permanent. Under its canopy there is room for every honest doubter, every sincere believer, every promulgator of a new truth, and every shade of medical opinion having a predicate in demonstrable truth. This science was founded upon two basic principles:

First: The recognition of the supremacy of nature in health and disease, the divine corrective and healing principle, *vis medicatrix naturæ.*

Second: The observance of the rule, from which there should be no deviation, of being guided by the indications of Nature in each case; and to use all possible diligence and discrimination in the selection of means, and following methods,

that have proved, or that may be likely to prove, the most efficient to promote the end desired. Surely, the Science of Therapeutics, thus founded, is broad enough to embrace within its fold every truly medical man or woman.

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